

OUT-OF-SCHOOL SETTINGS | GRADES 6-8

It's in the Bag: Engineering Bioinspired Gear

Unit Overview

What can we learn from plants and animals to help inspire new technologies? In this unit, youth look at examples of camouflage, protection, and bioluminescence in nature to engineer bioinspired bags or packs for a client. Youth become materials engineers as they explore the properties of materials and use the Engineering Design Process to create and improve their designs, making sure they meet their client's unique criteria and constraints.

Engineering Application/Unit Goals

Bioinspiration is the act of being inspired by living things, and engineers often look to nature as a source of inspiration for their work. Materials engineers use their understanding of the properties of different materials (such as metal, plastic, or woods) to design and improve technologies, including lots of common objects we use everyday. Many of these technologies started with an idea from nature, like Velcro strips inspired by sticky burrs that easily attach to clothing, or aerodynamic cars modeled after the shape of a boxfish.

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 as they work in groups to engineer a model home inspired by animal shelters.

Prep Activity 2: What is Technology?

Youth define technology and investigate fabrics through the lens of a materials engineer.

Activity 1: Camouflage

Youth design patterns to camouflage a piece of fabric for scientific researchers who need to blend into a forest.

Activity 2: Protection

Youth engineer protective gear for a roller derby client that is inspired by the diverse ways that animals protect themselves.

Activity 3: Bioluminescence

Youth engineer a switch to turn on an LED light inspired by bioluminescence for a client who is a spy.

Activity 4: Create Bioinspired Bags

Youth identify one of four clients for whom they will design a bioinspired bag or pack and create their design.

Activity 5: Improve Bioinspired Bags

Youth improve their bag or pack, making sure it meets their client's criteria and constraints.

Activity 6: Engineering Showcase

Youth communicate their work to visitors.

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