Sensational Sculptures

(ages 12 and up)

In this activity, designed for middle grade students, student teams work through the engineering design process to design and program a kinetic sculpture. Each group uses a laptop, LEGOs, and a microcontroller designed by the MIT Media Lab called the "cricket". The programming language utilizes symbolic blocks that the students fit together to develop their program, and then download into the cricket. A presentation of the final design to the class completes the activity.

An amusement park ride - "cricket" style.

Living LEGO (ages 12 and up)

With Living LEGO, students work through the steps of meiosis in "LEGO fish" cells to gain a better understanding of not only the process of gamete cell division, but also the ways that genes can be expressed. After running through the steps of meiosis, students predict the phenotype and genotype of possible offspring for two parents with a known genotype. Students discuss how a single phenotype could be the result of several different genotypes, and they see how the environment interacts with and affects the gene pool of a given population.

Edgerton Explorations (Strobe lighting is used in darkened conditions. Adults/children prone to epileptic seizures should inform instructor.)

An Edgerton Center classic, this activity introduces students to the technology of strobe photography. Students first watch a ten minute video on Doc and then explore spinning disks, photograph multiflash images of high speed events, and take part in high speed video experiments. A visit to the Edgerton exhibit at the MIT Museum ($3 per student) rounds out the day.

A multiflash image of a student taken using strobe lights.

Arranging a Visit to The Edgerton Center

Our programs are arranged for groups only. **All students need to be within the appropriate grade range listed.**

Please note - the content of classes does not change from year to year. We regret that **we can not offer lessons to students a second time.**

If you are interested in scheduling your class, community group, etc. for a field trip or if you have any questions about the program, please contact:

Amy Fitzgerald at 617.253.7931 or
amyfitz@mit.edu

http://web.mit.edu/edgerton/outreach/

Edgerton Center Outreach Program
Massachusetts Institute of Technology
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MIT Edgerton Center

Outreach Program

2008-2009 Activities

Hands-On Science & Engineering Programs for Upper Elementary - Middle School Groups

http://web.mit.edu/edgerton/outreach/

Our Activities:

Quizboards (ages 9 and up)

An introduction to the concepts of open and closed circuits and electrical components such as wire, resistors, LEDs and a battery is followed by students building their own quizboard. Students design the quiz questions and learn how to cut and strip wire and make electronic connections. Then, each student solders their electrical connections together. Students wire the board together and take their completed quizboard home.

A smoky introduction to soldering.

Flashlight Building (ages 9 and up)

Following an inspection of a "real" flashlight, students hypothesize about and draw the electrical connections in the flashlight. Students are then introduced to the convention of using schematics for illustrating electrical parts. Using these schematics, they design, build and solder their own circuit. Placing the circuit into the Flashlight casing and decorating the outside provides an exciting ending to this activity.

LEGO Car Rally (ages 8 and up)

In LEGO Car Rally students are challenged to build a car from LEGOs that is tested on a ramp course to see how far it will travel. In the activity students are encouraged to: systematically alter variables as they modify their cars, consider trade-offs between different design elements, and consider the effects of friction and center of gravity. This fun activity provides students with hands-on, mechanical engineering design experience.

CSI: MIT (4th grade and up, independent readers only)

This activity introduces students to forensics. Crime Scene Investigation: MIT presents students with an unsolved case and a set of evidence. They must analyze the evidence and use it to eliminate suspects until they discover the culprit's identity. Students will use blood typing, fingerprinting, chromatography, and microscope examination of hair and fiber samples to analyze clues found at the crime scene.

Students building their Motorized LEGO Car.

Motorized LEGO Car Rally (ages 10 and up)

In this activity, pairs of students are challenged to build a slow car using a Motorized LEGO kit. Students begin with a bicycle building activity which introduces the concepts of gearing down and gear ratios. They utilize this knowledge to design cars that are timed on a course to see how slow they can go. Students are encouraged to modify and alter their design throughout the experience. This activity provides students with a hands-on, mechanical engineering design experience.

Grungy Groundwater (ages 10 and up)

Groups of students first observe how water and "contaminants" (water tracing dyes) flow through different soils. They create a groundwater model using a variety of soils in a plexiglass shell. Students then contaminate their model (simulating fertilizer runoff, buried waste, chemical spills, etc) measuring the concentration of the contaminant at different points in their model. The scenarios' storylines help further students' thinking about the health aspects related to contaminated groundwater.

Students monitoring the pollution in a groundwater model.

Laser Mazes (ages 11 and up)

Teams of students are challenged to direct a laser beam through a wooden maze using mirrors. Students begin by experimenting with using mirrors to hit a bullseye with laser light. They review concepts of angles and hypothesize about how light reflects from a surface. Students determine that the angle of incidence is equal to the angle of reflection. Using this knowledge, students first model and then implement the path of the laser light through the different mazes.

Determining the path of the light through the maze.

Trying to create bacteria's circular DNA.

The Shape of Life: from helix to chromosome (ages12 and up)

Using LEGOs to model the basic structural elements of DNA brings the form and function of the double helix alive for middle schoolers. Students begin their exploration by using LEGOS to model the steps of somatic cell division. Students will examine a set of LEGOs that represent the double helix of DNA. This will help their understanding of what structures DNA is comprised of (nucleotides, sugars, phosphate bonds). Each group will then use these models to understand the nucleotide pairing rule and replication of the DNA strands.

Making a messy, but colorful, compound.

LEGO Chemistry (ages 11 and up)

LEGO Chemistry is an introduction to chemistry in two parts. The activities, geared toward middle schoolers, investigate a simple, but exciting, chemical reaction. During the first portion, the wet lab, students learn proper lab techniqe as they observe chemicals throughout a chemical reaction. After a review of some scientific terms, we finish the program by revisiting the reaction using LEGOs to model the elements.