Optics & Photography

Edgerton Explorations — all ages

Warning: 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 ($5 per student) rounds out the day.

Laser Mazes — 11+ yrs

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. **(ages 11 and up)**

Other Activities

CSI: MIT (5th grade and up, independent readers only)

Crime Scene Investigation: MIT presents an introduction to forensics with the unsolved case of an MIT "hack" - a fun, harmless practical joke performed by MIT students. Students will use blood typing, fingerprinting, chromatography, and microscope examination of hair and fiber samples to analyze clues found at the crime scene and determine the culprit.
Maximum of 16 participants

Grungy Groundwater — 10+ yrs

Groups of students observe how water and "contaminants" (water tracing dyes) flow through different soils. A model of a groundwater system is used to demonstrate how water contamination moves through an aquifer. Students consider the implications of the pollutant from the point of view of town leaders, scientists, and citizens. **(ages 10 and up)**

LEGO® Chemistry — 11+ yrs

LEGO Chemistry is an introduction to chemistry in two parts. 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 LEGO bricks to model the elements. **(ages 11 and up)**

Observing an exciting chemical reaction

Directions to the Edgerton Center

From 77 Massachusetts Avenue:
Enter the main building at the crosswalk, pass through the Main Lobby (Lobby 7), and enter the **Infinite Corridor.**

This hallway leads through several buildings (7,3,10), which you can distinguish by looking at door numbers. Just **past Lobby 10, and a room full of green couches** is Building 4, and another staircase on the right. **Take these stairs!** Climb to the 4th floor, and turn right. This is the Edgerton Center. **Room 4-402** is our classroom, on your right.

From Kendall Square T stop:
When you exit the T stop, **walk down Main Street** toward the flags (and away from the Charles River). Keep walking with the COOP on your right until you reach **Ames St.**

Turn left onto Ames St.,and walk until you reach the "pointy, triangular" tip of the Ralph Landau Building (MIT Building 66). Walk around the point and **keep this building on your right** (if it's raining you can walk inside this building). Go straight, hugging the buildings that are on your right.

When you can go no further without running into Building 8 in front of you, go up the stairs that are slightly to the left and through the wooden doors. The **Infinite Corridor** is straight ahead; go straight until you see a set of stairs off to your left. **Climb these stairs to the 4th floor**. Circle around to the left until you see a hallway full of wooden cabinets and photos. This is the Edgerton Center. Walk down the hall until you see room 4-402 on the left.

Edgerton Center Outreach Program
Massachusetts Institute of Technology
77 Massachusetts Avenue, Room 4-405
Cambridge, MA 02139-4307
617-253-7931

Edgerton Center Outreach Program

2014 Field Trip Programs

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

http://edgerton.mit.edu/outreach

EDGERTON CENTER
Build It, Learn It, Share It

Supported in part by the MIT Center for Environmental Health Sciences

Arranging a Visit to The Edgerton Center

The Outreach Program is a component of the Edgerton Center's operations. Program introduces a variety of science and engineering strands through hands-on lessons which require approximately 3 hours to run (includes 30 minute break for lunch). **Only one lesson can be booked per day.**

Register on-line at:
http://edgerton.mit.edu/outreach

• Programs are arranged for **groups only (12-24 students).**

• Classes are available during public school hours only. (**No afterschool/ weekend hours available.**)

• **All students must meet minimum age requirements.**

• The content of classes does not change from year to year. We regret that **we can not offer lessons to students a second time.**

• Programs are available free of charge.

Contact: Amy Fitzgerald at *amyfitz@mit.edu*
or 617.253.7931

EDGERTON CENTER
Build It, Learn It, Share It

Electrical Engineering

An introduction to soldering.

Quizboards

9+ yrs

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 to make electronic connections. Then, each student solders their electrical connections together. Students wire the board together and take their completed quizboard home. **(ages 9 and up)**

Flashlight Building

9+ yrs

Following an inspection of a "real" flashlight, students hypothesize about and draw the electrical connections in the flashlight. Students assemble and solder their own circuit and then place the circuit into the flashlight casing and decorate. Students are introduced to the convention of using schematics for illustrating electrical parts as an exciting ending to this lesson. **(ages 9 and up)**

Mechanical Engineering

LEGO Car Rally

8+ yrs

Students are challenged to build a car from LEGO bricks that is tested on a ramp course to see how far it will travel. 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 a beginner's understanding of potential and kinetic energy, and a hands-on, mechanical engineering design experience. **(ages 8 and up)**

Gear Up, Gear Down

10+ yrs

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 lesson. This activity provides students with a hands-on, mechanical engineering design experience. **(ages 10 and up)**

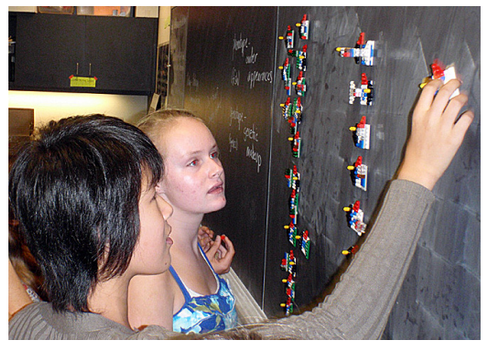
Building a LEGO car

Biology

The Shape of Life: from helix to chromosome

12+ yrs

Using LEGO bricks to model the basic structural elements of DNA brings the form and function of the double helix alive. Students begin their exploration by using LEGO to model the steps of somatic cell division. Students then examine a set of LEGO bricks that represent the components of DNA nucleotides (sugars, phosphates and bases). Each group will then use these models to understand the base pairing rule and replication of the DNA strands in the double helix. **(ages 12 and up)**



Organizing LEGO fish models by phenotype

Living LEGO

12+ yrs

Students work through the steps of meiosis in "LEGO fish" cells to understand the process of gamete cell division and the ways that genes can be expressed. After modelling the steps of meiosis with LEGO bricks, 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 see how the environment interacts with and affects the gene pool of a given population. **(ages 12 and up)**