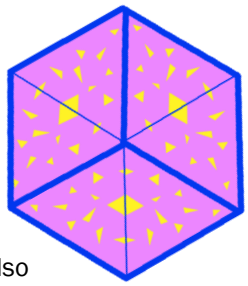
COYEC PROGRAMS

COYEC programs are K-8 Math and Science classes and activities generally offered at no cost. Some are a single activity, ranging from 1-2 hours. Others are offered through multiple sessions or on a weekly basis. Most hands-on classes are appropriate for a single class. Some demonstration activities are available for larger groups. Each activity includes a vocabulary sheet and multiple worksheets for assessment, grade level appropriate. All classes are conducted at your school, except for field trips.

If you are a teacher and would like to have COYEC visit your class, just send us an e-mail to info@coyec.org with the class(es) you are interested in, grade level(s) of your students, and potential dates and times. For more information, navigate to http://coyec.org.

FLEXAGONS

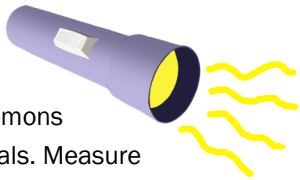
Grades 2-5



Flexagons are interesting topological contraptions that fold in unexpected ways. Some flexagons have practical applications, such as the door hinge that swings in and out, and some fancy greeting cards are also based on flexagons. There are tetraflexagons that fold vertically, horizontally, or both, and hexaflexagons, that fold in three directions. This hands-on activity involves cutting and folding - some manual dexterity is required. 60 minutes to 120 minutes is required, depending on the number of activities, student age, and available helpers.

BATTERIES I

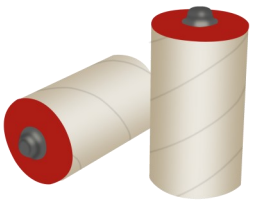
Grades 3-8



Make batteries (wet cells) from lemons and metal plates of different metals. Measure the strength of the electricity (voltage and current) produced with the various combinations of electrodes. Make a lemon-powered light with a lemon battery and a Light Emitting Diode. One or two sessions of 90 minutes.

BATTERIES II

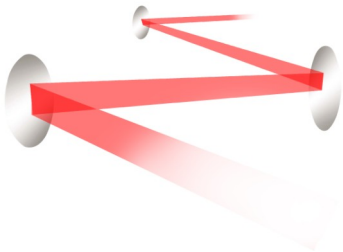
Grades 3-8



Make a pair of real dry cells (D size) and use them in a flashlight. Requires some degree of mechanical ability. Students keep their batteries and flashlights. All materials provided. Single session of 90 minutes.

LIGHT AND OPTICS

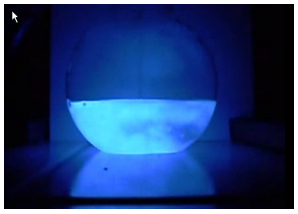
Grades 4-8



Lasers, Mirrors, Prisms and Lenses – activities with light and optical elements (lasers, lenses, prisms, gratings, mirrors) to learn about the properties of light and the reflection, refraction and diffraction of light. Concentrate the sun's rays using concave mirrors and convex lenses. Student must work together, holding mirrors, to transport a laser beam from one point to another. One or two 90 minute sessions.

GLOW IN THE DARK

Grades 4-8



Fluorescence, luminescence and chemiluminescence. Demonstrations - can be done for a larger audience. Requires a darkened room. A single session of 1 hr.

PLASTICS & POLYMERS

Grades 5-8

Grades 5-8. Plastics and polymers – students will make and study several different kinds of polymers while learning how they are made. The "Nylon Rope Trick" demonstration and students will make their own polymers from kitchen items. A single session of 90 mins.

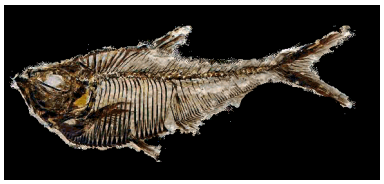
GEOLOGY & MINERALOGY

Grades 5-12

Students will learn about minerals of Colorado and make their own rock collections. We provide all the rock and fossil specimens for your students. Any size class. 90 minutes for a single session up to several sessions depending on the desired scope.

FOSSILS

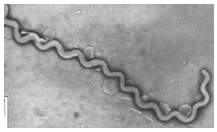
Grades 5-12



Students will identify fossils and make a personal fossil collection. Students will also prepare a fossil fish from the famous Green River formation. Requires one adult per 10 students—parents are fine—we train -we provide only one adult volunteer. All materials provided. Two or three 60 to 90 minute sessions.

PETROLEUM & FOSSIL FUELS

Grades 5-12



Where Do Oil and Gas Come From? – study crude oil and oil shale samples plus micro-fossils to better understand where our fossil fuel resources originate and how we get them out of the ground. A single 90 minute session.

GEOLOGY CLUB

Grades 3-8

Students will learn about minerals of Colorado and make their own rock collection, get hands-on experience with rock cutting and polishing tools, and go on collecting field trips. Typically, this program is offered before or after school one day per week. Field trips require transportation by parents.

MATH/SCIENCE BOWL

Grades 6-12

Similar to the AP Calculus Calc Bowl run annually by COYEC, we can develop math competitions for any level of K-12 math, for a single class, multiple classes, or even a school district. Just call us with your needs!

EGG DROP CHALLENGE

Grades 4-8

This activity focuses on gravity and air friction – Important forces of nature. Students will make either parachutes or Pathfinder landers to try to protect a falling egg by balancing gravity with air friction or by cushioning the landing with springy cushioning material. What size and shape of parachute works the best? What kind of padding best protects the egg upon landing? Requires access to a high location for launching. (we can provide a ladder). Designed for the NASA engineers of tomorrow. Two sessions of 90 minutes.

Visit us on the web at Coyec.org

MAGNETISM

Grades K-8

This activity focuses on how magnets and electromagnets work. Make a magnet out of iron filings and see how the magnetism is lost when the filings are shaken. Make a current meter with a coil of wire and a compass. Older students make several electromagnets and measure their strength as a function of the number of turns of wire.

Make a magnetic levitator with several ring magnets. Students make and keep their completed devices. One (lower grades) or two (higher grades) sessions of 90 minutes.

CO_2 DRAGSTER

Grades 3-8

Learn about the physics principal of action and reaction. Make and race a CO_2 cartridge-powered dragster as a demonstration of reaction. These are pretty easy to make, even for younger students. Can be done with a larger group or with learning buddies provided that there is work area available. Requires about 60 minutes to make the cars and another 60 minutes or so to race them, depending on the group size.

VIBRATION, SOUND AND MUSIC I

Grades 2-5

Sound pitch as a frequency of vibration, demonstrated by resonance in musical instruments and resonating bowls, vibration from earthquakes and its effect on structures. A combination of demonstration and hands-on experiments. Students will make humming horns and xylophones. All materials provided. One or two sessions of 60 to 90 minutes depending on scope and student age.

EARTHQUAKE!

Grades 3-5

How can an earthquake cause a house, bridge, or office building to collapse? Students will construct model buildings with different construction techniques and then test them to destruction with the Earthquake Simulator! Two sessions of 90 minutes.

SOAP AND SURFACE TENSION

Grades 1-5

Students conduct several fun experiments with surface tension, including the famous milk rainbow experiment. One session of 60 minutes.

COLD, COLDER, COLDEST

Grades 3-5

Fun experiments with cold—ice, dry ice, and liquid nitrogen. What happens to everyday materials when they get really cold may surpise you! The finale is making ice cream instantly with liquid nitrogen. One session of 90 minutes.

KITCHEN CHEMISTRY

Grades 1-8

Hands-on activities for kids exhibiting color, temperature and state changes through chemical reactions with materials found in everyone's kitchen. The can crusher! The color changing veggie juice! The thixotropic bullet proof vest! Why do some foods taste sour, salty or bitter? A single session of 90 minutes for demonstrations only, or two sessions of 90 minutes for student activities.

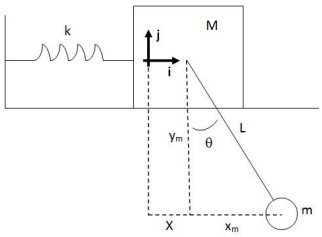
CHEMISTRY VARIETY SHOW

Grades 2-5

Heat, cold, endothermic, exothermic and polymerization reactions. Combination of demonstrations and activities - can do this for a larger audience or for two classes if desired. Demonstration is a single 1 hr session. Optional student activities add another 90 minutes.

SPRINGS AND PENDULUMS

Grades 4-8



Experiment with springs and pendulums, masses and weight. What factors control the frequency of oscillations of bobbing and swing masses? Work sheets. Calculation required. Two sessions of 90 minutes.

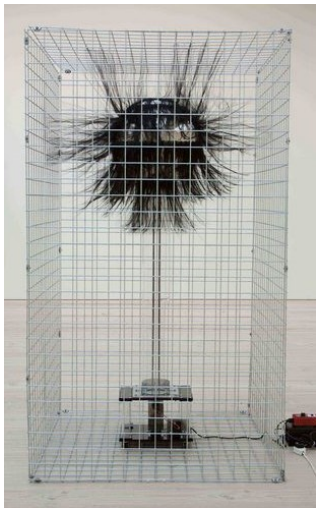
CATAPHYSICS

Grades 3-8

Levers, catapults and trebuchets - medieval physics applied to the problem of throwing heavy objects. Did you know that trebuchets have been built that can throw a full size car? Students will build catapults and complete in the Catapult contest. Three sessions of 60-90 minutes each.

ELECTRICITY I

Grades K-8



Demonstrations and experiments with static electricity and high voltage. Students will conduct experiments to determine what combination of insulating materials works the best as static electricity generators. Measure static electricity with an electroscope. Van de Graff and Tesla-coil electric spark demonstrations. One or two sessions of [60-120 minutes].

ELECTRICITY II

Grades 4-8

Experiments with electric circuits; the difference between series and parallel circuits; the energy storage properties of capacitors and inductors; how transistors amplify electric currents. Two sessions of 90 minutes.

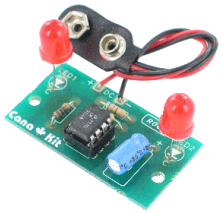
ELECTRONICS I

Grades 3-8

Use screwdrivers and other tools to tale apart electronic devices to learn about the basic electronic components – resistors, capacitors, transistors, inductors, transformers, and integrated circuits. Make an electronic component collection display. Students will keep their electronic component collections. One or two sessions of 90 minutes.

ELECTRONICS II

Grades 4-8



Electronic circuits. Make a working electronic circuit (light flasher) – involves learning about basic electronic components and soldering of components to printed circuit boards. Students keep their completed projects. Single session of 120 minutes or two shorter sessions.

BUBBLES

Grades K-5

We have developed the perfect formula for great bubbles. Small bubbles, medium size bubbles, and bubbles big enough to get in. What is a bubble? What makes bubbles last? Ideally, should be done outdoors on a calm day or in a cafeteria or other indoor spot with an easily cleanable floor. Single session of 60 minutes.

BIOLOGY, ENVIRONMENTAL AND SPACE SCIENCES

Grades K-8

COYEC volunteers offer a variety of classroom activities in the biological, environmental and space sciences. Send us an e-mail with a request for the topic you need and we'll do our best to accommodate your needs.

To sign up for free classroom

activities contact

Colorado Youth Education Connection

at

303-873-9969

or

info@coyec.org