



# ECBC STEM Classroom Activities

## Pre-K through 5th grade

Listed below is a sampling of some of our Pre-K through 5th grade activities that can be facilitated by one of our scientists or engineers right in your classroom.



ECBC provides all necessary supplies and presentation materials tailored to your curriculum needs.



Individual activities typically require between 50 minutes to 1 hour (including setup, instruction, and clean-up).

Activity Name and Description	NGSS: Disciplinary Core Ideas	Maryland Standards: Skills & Processes	Available as EIE?
<p><b>Battery Power</b> Students will construct power cells from household materials while learning electrical concepts like conductivity, polarity, voltage, and current. Working in small groups, students will troubleshoot circuit connections while taking voltage measurements with a digital multi-meter.</p>	Physical Science; Engineering	Constructing Knowledge; Communicating Scientific Information; Technology; History of Science	
<p><b>NEW!</b> <b>Buoyancy - Float or Sink?</b> Buoyancy and density are just a few of the topics demonstrated during this activity. Students explore the buoyancy of different materials in water while learning how density affects an objects ability to float or sink. An aluminum foil boat-building challenge rounds out the lesson.</p>	Physical Science; Engineering	Constructing Knowledge; Applying Evidence and Reasoning; Communicating Scientific Information	
<p><b>Build a Spectroscope</b> This activity guides students through the construction of their own spectroscope using rather simple materials while learning about properties of light like diffraction and refraction. Students will be able to compare the visible spectra produced by different types of lighting sources.</p>	Physical Science; Earth and Space Science; Engineering	Applying Evidence and Reasoning; Technology	

Continued on next page

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<p><b>Cheeky DNA</b> Students will extract their own DNA by swishing a sports drink around in their mouth then spitting it into a cup. They will use a saltwater/detergent solution to extract DNA from the harvested cells and will separate the DNA from the cellular debris using rubbing alcohol. A discussion of genetic structure and DNA as a blueprint for life introduces this topic.</p>	Life Science	Constructing Knowledge; Applying Evidence and Reasoning; Communicating Scientific Information; Technology	
<p><b>Chemical Reactions</b> Students learn to identify the differences between physical changes and chemical reactions while performing three distinct reactions: acid-base (gas production and color change), catalytic reaction (gas production, heat generation), and polymerization reaction (liquid to semi-solid).</p>	Physical Science	Constructing Knowledge; Communicating Scientific Information	
<p><b>Colors of Leaves / Plant Pigments</b> This lesson explores the science of Fall colors through a discussion of seasonal changes and observations by students of the varying colors of leaves. Students conduct a hands-on extraction of the pigment chlorophyll from spinach leaves and separate the pigment into several different colors using a technique called chromatography.</p>	Life Science	Constructing Knowledge; Communicating Scientific Information	
<p><b>NEW!</b> <b>Crystal Snowflakes</b> Do you know how snowflakes form? In this activity, students are guided through the process of growing Borax "crystals" in the shape of a snowflake or icicle, while learning about minerals, their structures/shapes, and crystallization.</p>	Physical Science; Earth and Space Science	Constructing Knowledge; Applying Evidence and Reasoning; Technology	
<p><b>CSI Crime Scene</b> A scientist will develop a crime scene scenario and students will be taught different sampling and analysis techniques that can be used to solve the case. Pigment chromatography is one of the separation techniques used to analyze suspect ink samples during the activity.</p>	Physical Science; Life Science	Constructing Knowledge; Applying Evidence and Reasoning; Communicating Scientific Information; Technology	
<p><b>Egg Drop Test</b> Students will work with a scientist or engineer to design a contraption to protect an egg when dropped. Discussion topics include the science of moving objects, Newton's 1st, 2nd and 3rd laws of motion, force, acceleration, and inertia.</p>	Physical Science; Engineering	Applying Evidence and Reasoning; Communicating Scientific Information; Technology	
<p><b>Fun with Polymers</b> Students will make "Gak", "Flubber", or bouncy-balls using household chemicals while learning about polymers and chemical reactions. The activity can be paired with a discussion of the Dr. Seuss book Bartholomew and the Oobleck. Variations on this activity include discussions of different types of plastic polymers and recycling.</p>	Physical Science	Communicating Scientific Information; Technology	

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Activity Name and Description	NGSS: Disciplinary Core Ideas	Maryland Standards: Skills & Processes	Available as EIE?
<p><b>Hand-Pollinators</b> Students are introduced to Agricultural Engineering through discussions on how particular insects are crucial in the success of food crops through pollination. Hands-on activities include the construction and testing of hand-pollinators.</p>	Life Science	Communicating Scientific Information; Technology	
<p><b>How Clean are Your Hands?</b> Students will learn the importance of proper hand washing and hygiene by covering their hands with a UV sensitive powder, then washing them and putting their hands under a UV light. They will see how much of the powder remains after they wash their hands. The powder represents germs and will show them how many germs are left on their hands after washing.</p>	Life Science	Communicating Scientific Information	
<p><b>NEW!</b> <b>Magnetic Cereal</b> This activity introduces students to the field of food science through an examination of one of the minerals typically added to foods we eat every day. For example, bread, pasta, and cereals are “fortified” with iron. Iron plays an important role in the ability of our red blood cells to carry oxygen throughout the body. A hands-on activity allows students to see the iron that is added to bran cereal and “extract” it using a magnet.</p>	Life Science; Physical Science	Communicating Scientific Information; Technology	
<p><b>Marshmallow Catapults</b> Students will construct catapults using different materials. The students will launch marshmallows and measure their distances. They will then look at their designs and make modifications to make the marshmallows fly shorter or longer distances.</p>	Engineering	Communicating Scientific Information; Technology; History of Science	
<p><b>Pendulum Painting</b> Students are introduced to Newton’s Laws of Motion with demonstrations of acceleration, equilibrium, and forces that affect objects at rest and at motion. A large pendulum structure is used to create “pendulum paintings” with temporary paint and construction paper.</p>	Physical Science	Communicating Scientific Information; Technology	
<p><b>Reverse Engineering – DIY Speakers</b> Students are introduced to the role of electricity and magnetism as they “reverse engineer” a standard home audio speaker using simple materials. At the completion of this activity, students will be able to test their “DIY” speakers using a stereo amplifier. Topics include magnetism and sound waves along with a discussion of how the military uses reverse engineering.</p>	Physical Science; Engineering	Constructing Knowledge; Technology	
<p><b>Spaghetti Structures</b> In this activity, students use the Engineering Design Process to construct and test a sturdy structure from dry spaghetti and marshmallows. The integrity of the design is tested by applying weight to the structure.</p>	Engineering	Applying Evidence and Reasoning; Technology	

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Activity Name and Description	NGSS: Disciplinary Core Ideas	Maryland Standards: Skills & Processes	Available as EIE?
<b>Strawberry DNA</b> This activity is similar to "Cheeky DNA" except that students will use strawberries instead of their own cheek cells as the source of DNA. A discussion of genetic structure and DNA as a blueprint for life introduces this topic.	Life Science	Constructing Knowledge; Technology	
<b>The Color of Science</b> This activity illustrates the concept of pH as a measure of the strength of an acid or a base. Students will use a red cabbage extract as a pH indicator to test the pH of different substances through a colorimetric (color-changing) reaction.	Physical Science	Constructing Knowledge; Technology	
<b>They All Fall Down: Playdough Structures</b> Students work in groups to design, construct and test 3D tower structures assembled from popsicle sticks and play-dough. The resulting designs are tested for their ability to withstand the forces created by blowing wind.	Engineering	Applying Evidence and Reasoning; Technology	
<div style="background-color: #004a99; color: white; padding: 2px; transform: rotate(-45deg); display: inline-block;">NEW!</div> <b>Things that Glow</b> Why do fireflies have glowing behinds? How do glow-sticks work? Students will investigate these questions while exploring different types of luminescence with hands-on activities involving safe light-producing chemical reactions.	Physical Science; Life Science	Communicating Scientific Information; Technology;	
<b>Water Filtration</b> Students will hypothesize the effects of different materials on filtering water. They will assemble a filter using commonly available household materials to see which ones remove the most debris creating the cleanest water.	Engineering	Applying Evidence and Reasoning; Technology	
<b>Water Wheel</b> Today, it is more important than ever to rediscover alternate energy sources. In this activity, students will work in groups to engineer, design, and build a water wheel which can harness the most power from a flowing water source. The resulting water wheels will be evaluated and tested to see which design can lift a weighted object the greatest distance.	Engineering	Applying Evidence and Reasoning; Technology; History of Science	
<b>White Powder Scare</b> Students are presented with a suspicious scenario involving letters received through the mail that contain white powders. They will have to sample the suspect powders and determine if they have a potential bio-agent or "bad bug" using a colorimetric type test.	Life Science	Applying Evidence and Reasoning; Technology; History of Science	

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