



## 2014 In-Class Field Trips for Grades K-6



*Mad Science programming is so fun that kids won't notice they're learning!* But you'll recognize these adventures as quality STEM education aligned to Minnesota science standards.

**Length:** All In-Class Field Trips are one hour unless otherwise noted.

**Price:**

\$149 (up to 20 students),

\$169 (up to 25 students), or

For big groups, consider booking a show. Visit [MN.MadScience.org/SpecialEvents.org](http://MN.MadScience.org/SpecialEvents.org) for details.

**Discounts:**

\$10 discount per program if booking 5 or more at one time.

\$20 off the 2<sup>nd</sup> program using the same equipment in the same room back to back.

Sign up for Mad Science eNews at [MN.MadScience.org](http://MN.MadScience.org) and catch special insider *Sales!*



**Travel charge** applies for distances over 15 miles from St. Paul. Take home projects subject to change.

For **Preschool Workshops**, visit [MN.MadScience.org/preschoolprograms.aspx](http://MN.MadScience.org/preschoolprograms.aspx).

Scroll down for [NASA Programs](#) developed exclusively by NASA in partnership with Mad Science!

### All about Animals

Learn about the habitats and natural adaptations of animals, including camouflage; study models of animal teeth and claws. Hear the call of the wild and identify animal sounds. Use your Animal Tracks take-home project to create casts of animal tracks, just like real naturalists!



#### Beguiling Bubbles (Grades K-2)

Have you ever seen a square bubble or stood inside a giant bubble? Have you ever seen a soap-powered boat race? Do all this and much more. Make your own tetrahedron bubble wand to take home.

### Black and Blue Oceans

Study the effect that pollution is having on our oceans. Learn how we can save our seas and the plants and animals that live in them. Experiment with how oil spills affect us all.

### Body Basics

Through a hands-on approach you explore how the digestive, skeletal, muscular and respiratory systems work. Includes demonstrations of how the lungs and the digestive system work. Participate in engaging activities exploring brainpower, pumping hearts, and strong skeletons.

### Bugs!

Many people think bugs are just pests, but you'll explore why they are an important part of our ecosystem. Examine a giant preserved Lubber grasshopper. Take home your own Insect-A-Vision and see the world through a bug's eyes.



## Cells

Join us as we journey into the microscopic world of cells. Learn about osmosis and the anatomy of a cell. Use scientific equipment and the scientific method to discover how these amazing cells work together to sustain life. Use what you have learned to build a model cell in a petri dish.

## Chem in a Flash

Hop on board the chemistry express for a high-speed science experience! Perform instantaneous experiments in this fast-paced class on split-second reactions that go like mad! Pick up an Action Flask kit and have a blast!



## Che-Mystery

Eliminate the mystery in chemistry! Learn the difference between physical and chemical reactions. Watch chemicals react to make colors appear and disappear. Learn how crystals grow. See Styrofoam sizzle away in seconds! Take the lab home with your own Dynamic Dish.

## Current Events

Take a tour on the electron freeway! Learn about conductors, insulators and other elements in the world of electricity. Learn how an overloaded fuse pops a balloon. Make your own series and parallel circuits and try the nerve tester game. Take home a Circuit Maze.

## Detective Science

Join Mad Science in the crime lab! Discover how science is used to solve crimes. Watch as the classroom is transformed into a crime lab for this exciting exploration of the fundamentals of forensics. Take home your very own Personal Profile Kit.



## Dinosaurs

Dinosaurs are extinct...or are they? Put your paleontology hat on and explore the world of these prehistoric beasts. Compare your footprints with a Triceratops, and your jawbones with a Camptosaurus. Take part in a simulated dinosaur dig; can you figure out how to put the skeleton together? Take home your own fossils and a T-Rex tooth cast.

## Dry Ice Capades

Explore the three states of matter. Melt metal in boiling water, build a giant bubbling potion and freeze water with just a breath of dry ice! Use your Thermocolor Cup to test the temperature of liquid matter in your home!



## Earthworks

Learn about the Earth's crust, mantle and core. Discuss tectonic plates and how their movements cause stress on the Earth. Make an underwater volcano erupt. Build your own Sedimentary Stacker to take home.

### **Egyptology**

Write a message with Hieroglyphics to take home with the scarab you paint. Use the right tools and participate in an archaeological dig for Egyptian artifacts right in the classroom. Enjoy the story behind the objects you find and then use them when you help wrap the mummy. At that point, your team will construct a pyramid leaving room for the sarcophagus.

### **Energy Burst!**

Explore the fundamentals of energy using a variety of toys to experiment with the conversion of potential energy into kinetic energy. Watch light energy turn a radiometer. Build and take home your own play catch toy.



### **Fantastic Flyers**

Follow in the footsteps of the Wright Brothers and learn about aircraft and the four forces that affect flight. Learn how to make your paper airplanes do amazing loops and rolls. Build a Skyhawk Glider with rubber band powered launcher to take home.

### **Fun-damental Forces**

Feel the force . . . that is, the force of gravity, inertia, and momentum. Use Newton's Laws of Motion to zing toy cars through gravity defying loops. Let Newton's Third Law turn you in circles as you experiment with a giant bike wheel gyroscope. Take home your own play catch toy.



### **Get Connected**

See the sound of your voice with an oscilloscope; set up a telephone network. Hook up a radio transmitter to hear your voice on the radio. Play cell tower relay to track cell phone users. Take home a Wired World Box that uses optical fibers to connect different points on a map.

### **Glow Show**

Probe the properties of light and explore applications of glow-in-the-dark technology! Discover amazing things that glow brightly in the dark and watch chemiluminescence as two liquids mix to create light! Have at-home fun in the dark with your Glow Sheet Card!

### **Go-Go Gravity**

Experiment with the force of gravity. Can gravity make a metal ball roll up hill, or make water travel up a tube? Discover the secret behind the mysterious Mad Science Water Machine, then build your own to take home.



### **Good Vibrations**

Discover how sound travels through liquids, solids and gases but does not travel through a vacuum. Take part in an in-house band and then make your own Pan Pipe.

### **Great Gravity**

Gravity holds our solar system together. The earth, sun, and planets have gravitational pull and so do you! Test your skill at pendulum bowling; try to find the center of gravity for some unusual objects. Make your own Balancing Buddy.

### **Harnessing Heat**

Learn how the movement of microscopic molecules produces heat. Investigate how thermometers work. Experience an experiment that will show you that the hot and cold we feel is relative. Experiment with materials that transfer heat at different rates. Continue science exploration at home with the Mad Science Heat Sheet.

### **Heredity (grade 5-7)**

Learn why you are you! Master the basic principals of heredity. Learn about the inheritance of traits, the principal of dominance and how genotypes represent phenotype. Discuss the implications of new genetic technologies in society and take home some DNA in a tube.



### **Junior Reactors**

Learn about the periodic table, atoms and molecules. Discover how atoms combine to make molecules. Use your set of Atomic Coins to build samples of some simple molecules.

### **Kitchen Chemistry**

Explore the laboratory that we call a kitchen as you test for iron and protein. Learn about the power of baking soda in food and how living organisms cause bread to rise. Investigate your digestive system and take home a Digester Inspector.

### **Lab Works**

Delve into the world of the Mad Science laboratory. Learn the proper names and uses of various pieces of laboratory equipment. Take home your very own Graduated Gear cylinder to start your own lab and continue your research!

### **Life in the Sea**

Go under the sea and discover the complex world of ocean ecosystems. See how you measure up against a great white shark. Learn how sea creatures have adapted to fit their environment. Take home an Anaglyph Sea Puzzle.



### **Lights . . . Color . . . Action!**

Exciting experiments blend a rainbow of colors to produce white light. Explore the color spectrum with prisms and diffraction glasses. Look through tinted lenses to experience color blindness. Build your own Technicolor Blender to continue experimenting at home.

### **Mad Science Machines**

(This Premium Program has an additional \$20 fee for groups up to 20; \$25 fee for groups up to 25; and \$30 fee for groups up to 30.)

Learn Mad Mechanics as you launch with levers, work with wedges, and secure with nuts, bolts and screws. Help demonstrate how pulleys make moving heavy objects easy. Assemble and take home a Mad Science rubber band powered Drag Racer.



### **Mineral Mania**

Watch as rocks and minerals glow under an ultraviolet light. Learn about mineral formation and how to identify different types of minerals. Search for minerals in class and start your own Mineral Collection with what you find!

### **Mission Nutrition**

Set out on a nutrition mission as you perform experiments to learn about food groups and how food fuels our bodies. Find out what a calorie really is and use your knowledge to have a healthy diet and lifestyle. Experiment with a chemical mixture called an emulsion and learn how important it is to your body. Take home your own Step-O-Meter, a fun pedometer to count your steps.



### **Mix It Up**

Investigate the difference between mixtures, suspensions and solutions. Pull soap from solution and filter the color out of water. Take home your own Super Sorter.

### **Movie Effects**

Discover how sound and weather effects are created. Try out some cool anaglyph 3D glasses. Take a closer look at how animation works, then take home your own Cartoon Creator with a mini-flip book and mini-stencil to create your own short animated feature.

### **Moving Motion**

Discover the science behind movement when you learn what Newton knew about motion. Experiment with friction, inertia, and other forces that affect the way things move. Make your own inertia kit to continue experimenting at home.



### **Mysterious Magnets**

Magnets have a mysterious energy that is truly fascinating. Try to out-muscle an electromagnet. Magnetize ordinary metal; confuse a compass needle. Discover the world's simplest motor. Take home your own mysterious Magnetic Lab.

### **Optical Illusions**

Explore optical illusions such as the mirror mirage, twisting copper coils, and convex and concave mirrors that all demonstrate how physics can trick our eyes. Manipulate flexible mirrors to explore the world with inversed vision. Build your own Periscope to take home.

### **pH Phactor (Acids & Bases)**

Slide down the colorful pH scale and dip into the world of acids and bases! Explore the pH extremes with your Reaction Tube Kit in what is sure to be a popping experience! Discover whether liquids found in your home are acids or bases using your personal pH Paper!

### Radical Robots

Operate different robots that use a variety of sensory devices, such as infrared, sound or light detection. Operate a robot with six legs or one with wheels and command a robot to play soccer. Try out a robotic arm and build your own Mechano-Hand to take home.



### Rex Rocket Building

(This 2 hour program fee is \$278 for groups up to 20; \$318 for groups up to 25; and \$378 for groups up to 30)

Discover the fundamentals of rocket flight and aerodynamics with our advanced rocket building class. Each student constructs a model rocket, not from a kit but from everyday materials. This rocket has a small payload bay and a parachute recovery system. This class is a great, hands-on way to investigate space flight and aerodynamics and includes a model rocket launch demonstration! Using distances, angles and tangents, students calculate the height the rocket reached in flight.



### Science of Magic

Is it magic? No....it's science! Sworn to secrecy, you'll learn the science behind some great magic tricks. Can you escape Houdini's chains? Watch a rabbit, handkerchief, water and other items disappear right before your eyes. Investigate how psychology, chemistry and physics combine to create amazing magic effects. Astound your friends with a couple of magic tricks!

### Science of Art

Make the connection between science and art. Mix colors, use science to separate colors, uncover how physics and chemistry are used to discover art forgeries and see how a distorted image can look normal. Take home a color-mixing Rainbow in a Tube.

### Science of Toys

Children discover the science behind classic toys! Experiment with a walker, gears, magnetic gyro wheel, circuit toy and more. Take home a Mad Science yo-yo that uses linear and angular momentum at the same time!

### Scientific Method (grade 3-5)

Use a model dragster and get a fun introduction to this widespread methodology used by scientists everywhere. Students learn about potential and kinetic energy as they make experimental designs and test their designs with hands-on activities.



### **Seeking Our Senses (grade K-2)**

Take a tour of how you perceive your world every day as you explore your five senses. Join us as we discover how eyes can't always tell what's real. We can identify objects using only sound, read with our hands, and learn how sight, taste, and smell combine to really enjoy a glass of soda! Take home a sense-sational painting.

### **Shocking Science**

Excite some electrons and create electrical circuits. Use your body's conductivity to direct the lightning inside a plasma ball. Experiment with an electroscope. Make your own Firefly Circuit and watch it light up when the electrons flow.



### **Slime Time**

Ooze into a gooey hour of sliming around! Learn about polymers and their unusual properties while taking part in a series of slimy experiments. Create your own concoction of Mad Science Slime to take home.

### **Spinning Science**

Observe Newton's Laws of Motion by using gyroscopes, tops, and yo-yos. Discover what makes bicycles easy to ride. See the amazing gyro-tube that refuses to roll downhill. Feel what it is like to spin at a dizzying speed and take home your own spinning top.

### **Sonic Sounds**

Sound travels in waves and lots of fun experiments prove it. Make an ordinary clothes hanger sound like a giant gong. Transform your voice into something you have never heard before and take home a Sonic Horn.

### **Super Power Sources**

Examine alternative energy sources as you experiment with batteries, solar cells and a wind turbine. You will never be left in the dark when you have your very own handheld Crank 'n' Shine electricity generating flashlight. No batteries required, just squeeze the handle!

### **Super Sticky Stuff**

Stick it to the walls, and push the power of tape to the limits in this adhesive hour on things that cling! Build a bond with glue and get attached to Professor Beaker Dude!

### **Super Structures**

Junior engineers discover the amazing strength of triangles, cylinders and arches. Solve the puzzle of constructing a Roman arch. Use teamwork to build an earthquake resistant building. Build and take home your own structures you create using toothpicks and marshmallows!



### **Tantalizing Taste**

How much of the flavor that we taste is triggered by visual cues? How much is associated with smell? Be the judge as you experiment with taste sensations. Take the "Mad Science" soda pop taste challenge. Take home your own Taste Test Kit.

### **Under Pressure**

Feel the pressure, air pressure that is. Learn about Bernoulli's Principle and use it to make a ping pong ball float in mid air. Watch the effects of a swirling vortex as it sails across the classroom. Take home your own da Vinci parachute!

### **Wacky Water**

Investigate the concept of density, predict which object will sink and which will float. Simulate an oil spill and experiment with the different techniques available to contain it and clean it up! Learn about ocean waves, convection currents and buoyancy. Build your own Rescue Diver to take home.

### **Walloping Weather**

Learn why certain cloud types form; combine the right ingredients to make a cloud inside a bottle. Discover the power of air pressure and lightning. Use thunder tubes to create thunder sound waves. Take home your personal Sun Beads UV ray detector.

### **Watts-Up**

Uncover the mysteries of static electricity and lightning as we perform a series of experiments with a Van de Graaff generator. See if it makes your hair stand on end. Experiment as you charge and discharge objects with static electricity. Take home your own Static Stick and watch the Styrofoam balls jump to get away from you.

### **Where's The Air?**

Air is everywhere. We can't see it, taste it, or hold onto it but you will understand first hand that it is a powerful invisible force. Imagine crushing a soda can with air power. Test what happens to a marshmallow when you place it in a vacuum. Take home an Air Blaster.



### **Worms (Grades K-2; 45 Minutes)**

Children use magnifying glasses and other scientific tools to explore the fascinating life of a worm. Learn how important worms are for healthy soil, and how mushrooms grow. Kids take home their own worm picture.

**See next page for NASA Mad Science programs...**





## NASA Mad Science Programs



### **Atmosphere & Beyond - NASA Workshop**

We're on a mission to explore the atmosphere on Earth, and beyond! Travel to the end of the rainbow and make a sunset! Mix up various planetary atmospheres, one molecule at a time! Take home a *Meteorological Station* to monitor daily changes in three elements of Earth's weather.

### **Living in Space - NASA Workshop**

Experience the life of an astronaut as you suit up for space flight! Use teamwork to complete an important space mission, building a model space station. Learn about the challenges of working in space while sewing a tear in the space station's soar panel with your *Spacewalk Mission* take home project.



### **Planets & Moons - NASA Workshop**

Explore the farthest reaches of our solar system and create a lunar eclipse in this "mad" planetary tour! Learn about the planets and how they stack up. Learn how scientists use gravity to slingshot space probes deep into outer space with your take home project the *Gravity Assisted Launcher*.

### **Rocket Science - NASA Workshop (Premium charge of +\$2.25/student)**

This is your chance to be a rocket scientist! Investigate the four forces of flight with the help of a Unique Flying Object! Explore the science involved in rocket construction as you build your own *Skyblazer II Rocket™* that you can take home!

### **Space Phenomena - NASA Workshop**

Probe the mysteries of meteors and bounce around satellite light in this phenomenal program on space events! See comets up close as one if formed before your eyes, and take home your very own *Space Telescope* to bring faraway objects into focus.

### **Space Technology - NASA Workshop**

Discover technology designed for outer space! Steer a laser beam through a laser maze, find hidden mountains using the principles of radar technology and discover everyday objects originally designed for use in space! Take home a *Stereoscopic Viewer* and use the unique viewing cards to explore the surfaces of different bodies in the solar system.

### **Space Travel (Rocket Demo) - NASA Workshop**

Learn what it takes to be a true globetrotter! Race a balloon rocket. Take a close look at model rocketry while learning how rockets fly. Learn how to prepare a model rocket for flight and take part in a rocket launch. Build your very own *Space Copter™* to fly to the skies!

### **Sun & Stars - NASA Workshop**

This stellar program is your ticket to the stars! Watch star dust burn, and journey through a soapy galaxy as you investigate the life cycle of stars! Bring home a *Cosmic Disk*, a pocket sized star chart.