



**Mad Science correlations to  
The Next Generation Science Standards (NGSS)  
For Middle School Level (Upper Level 6-8)**

**- Standards Arranged by Topic -**

**Middle School Level Upper level**

**MS.Sturcture and Properties of Matter**

**Mad Science Programming Correlated to MS-PS1-1:**

**Junior Reactors**

Students are introduced to the concepts of atoms and reactions! A demonstration of the differences between physical and chemical reactions is followed by a hands-on series of experiments. The relative size of an atom is introduced in a cutting edge race as the children try to reduce a strip of paper down to its atomic size! The class wraps up with a creative molecular session. The children explore how atoms join together and how molecules react using their Take-Home Atomic Coins kit.

**Matter of Fact**

Explore molecules and how they are held together. See the dramatic differences between physical and chemical changes as you mix up a batch of your very own Mad Science Putty to take home.

**DNA**

This workshop is being developed specifically for Grades 6-8, and will focus on one of the hottest topics in science today: DNA. An introduction to molecular biology will begin with the study of human chromosomes, how we inherit them and their composition. Students will take a close look at DNA by assembling a DNA model that they will be able to take home and will get to see real live DNA as they learn the molecular technique of DNA spooling. A teacher's guide and student activity workbook will be included with this workshop.

**Mad Science Programming Correlated to MS-PS1-4:**

**Harnessing Heat**

Take on temperature! Shake up a storm and see how friction creates heat. Feel how hot and cold can change at a touch. Apply your red-hot knowledge on your very own Heat Sheet!

**MS.Chemical Reactions**

**Mad Science Programming Correlated to MS-PS1-2:**

**Junior Reactors**

Students are introduced to the concepts of atoms and reactions! A demonstration of the differences between physical and chemical reactions is followed by a hands-on series of experiments. The relative size of an atom is introduced in a cutting edge race as the children try to reduce a strip of paper down to its atomic size! The class wraps up with a creative molecular session. The children explore how atoms join together and how molecules react using their Take-Home Atomic Coins kit.

## *Mad Science Programing correlated to the NGSS*

### **pH Phactor**

Students explore the crazy chemistry of acids and bases in this fascinating one-hour program on the pH scale. The pH Phactors hydrogen and hydroxide give a colorful introduction, and the Phantastic pH test is applied to common household chemicals. Students are challenged to bring a mystery liquid to a perfect pH balance. The Phestival ends with a Stopper-Popper reaction!

### **Chem in a Flash**

Children take a trip through several fields of chemistry and discover the factors that can change the rate of a reaction. The class begins with a role-playing activity in which volunteers act out two different rates of reaction. This is followed by a hands-on demonstration on oxidation where the role of salt—as a catalyst—is observed. The instructor demonstrates quick-acting reactions such as precipitation and acid-base reactions, followed by a balloon-expanding experiment to test limiting reagents (factors). Children will explore crystallization and receive a Take-Home Action Flask kit to perform more experiments. The class wraps up with a color-changing electrolysis demonstration that covers these cool chemical concepts.

### **Che-mystery**

Discover the differences between chemical and physical reactions. Discover how water can turn into wine, how carbonation makes you burp and what a non-Newtonian fluid is. Make your own bouncing polymer to take home!

### **Kitchen Chemistry**

Children get clued in on the chemical reactions that occur when they prepare, analyze, and digest their food. The class gets cooking with a color-changing solution display. Children divide common kitchen activities into chemical and physical reactions. A balloon blow-up demonstration helps them discover that yeast makes bread rise. Children test food samples in search of nutrients, starch, and protein. They discover what happens after they eat and digest nutrient-rich foods with their own Digestor Inspector Take-Home.

### **Matter of Fact**

Explore molecules and how they are held together. See the dramatic differences between physical and chemical changes as you mix up a batch of your very own Mad Science Putty to take home.

## **MS.Forces and Interactions**

### **Mad Science Programing Correlated to MS-PS2-1:**

#### **Moving Motion**

Children learn all about the forces behind the movement of planes, trains, and automobiles. Catapulting into Newton's laws of motion lets children get a feel for friction, inertia, and gravity. They see how mass affects movement and try out some motion tricks! Children build an action-reaction car to take home.

### **Mad Science Programing Correlated to MS-PS2-3:**

#### **Magnetic Magic**

Explore the power of magnets! Create electromagnets and control a compass needle. See a

## *Mad Science Programming correlated to the NGSS*

magnetic accelerator in action. Take home your very own Magnet Lab to continue your research!

### **Mad Science Programming Correlated to MS-PS2-5:**

#### **Magnetic Magic**

Explore the power of magnets! Create electromagnets and control a compass needle. See a magnetic accelerator in action. Take home your very own Magnet Lab to continue your research!

#### **Watts-Up**

Charge up on static electricity! Make indoor lightning and conduct hair-raising experiments with our electro-static generator. Use your Static Stick to test the movement of electrons in your home!

#### **Mischievous Magnets**

What makes metal magnetic? What shapes do magnetic fields invisibly form around different shaped magnets? Can compasses really help you to find your way? Discover the answers to these and many more questions about magnets and their fields.

### **MS.Energy**

### **Mad Science Programming Correlated to MS-PS3-2:**

#### **Energy Burst!**

Children explore the energy of motion (potential versus kinetic energy), and how energy can be conserved. They pop, jump, and flip with hopping, swimming, and swinging toys. Children check out the kinetic energy in rubber, band-wound gadgets and reach their potential with a kinetic marble-bounce take home.

#### **Science of Toys**

Children test, play, and ponder over what makes toys work. They spin into action with kinetic top toys. One changes color and one flips over, but they all release stored energy. Children balance bugs and birds to reveal their centers of gravity. They learn that opposites attract with magnetic toys and then take a turn at creating a gear train. Don't forget to move out of the way for The String Thing—it's motorized! The class winds down with a Yo-yo Take-Home.

#### **Space Travel**

Students will launch their investigation of rocket propulsion using the compressed air inside balloons for thrust. The class will race balloon rockets and be challenged to devise a balloon-powered rocket car. Experimenting with the fast moving air produced by spinning propellers, students will build a unique Shuttle Copter to take home. For our grand finale, students will witness a thrilling model rocket launch, and learn the meticulous preparations necessary to send up a rocket!

#### **Planets and Moons**

Students set off on a voyage to discover the Solar System. Students impersonate the planets to compare their sizes and distances from the Sun, recreate a solar and lunar eclipse, and become particles on a voyage into a planet's core. Students build planetary puzzle cubes to take home; these cubes can be put together to form images that are out of this world!

## *Mad Science Programing correlated to the NGSS*

### **Mad Science Programming Correlated to MS-PS3-3:**

#### **Harnessing Heat**

Take on temperature! Shake up a storm and see how friction creates heat. Feel how hot and cold can change at a touch. Apply your red-hot knowledge on your very own Heat Sheet!

### **Mad Science Programming Correlated to MS-PS3-4:**

#### **Harnessing Heat**

Take on temperature! Shake up a storm and see how friction creates heat. Feel how hot and cold can change at a touch. Apply your red-hot knowledge on your very own Heat Sheet!

#### **Wacky Water**

Water, water everywhere! Explore the amazing properties of water – density, solvency and surface tension in this hands-on look at how water works. Build a Rescue Diver to take home to continue your underwater explorations.

### **MS. Waves and Electromagnetic Radiation**

### **Mad Science Programming Correlated to MS-PS4-2:**

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

Celebrate the science of color! Split your name in ink and reveal numbers with color filters. Make a rainbow out of white light and try on diffraction lenses. Color the world with your very own Technicolor Blender!

#### **Good Vibrations**

Investigate the science of sound in this hands-on introduction to the basics of vibration, frequency and pitch. Discover how instruments use vibration to make music and you will be amazed as you hear church bells through your fingers and music though your teeth.

### **MS. Structure, Function, and Information Processing**

### **Mad Science Programming Correlated to MS-LS1-1:**

#### **Cells**

This hands-on workshop provides students with an introduction to cell structure, including an understanding that cells are the building blocks of all living things, basic cell process and cell division.

#### **Photosynthesis**

This workshop provides students with an introduction to photosynthesis, including an understanding of the chemical processes at work in the plant, plant respiration, and the role of plants in food webs.

## *Mad Science Programming correlated to the NGSS*

### Mad Science Programming Correlated to MS-LS1-2:

#### Cells

This hands-on workshop provides students with an introduction to cell structure, including an understanding that cells are the building blocks of all living things, basic cell process and cell division.

### Mad Science Programming Correlated to MS-LS1-3:

#### Inner Workings

This workshop will take an in-depth look at two of our organ systems: what they look like and how they operate. Students will learn to locate, name and orient the organs that make up these two systems and discuss how they interact. Students will examine the digestive tract and develop and appreciation for its length and complexity. Students will have the opportunity to measure their own blood pressure and construct a two-pump heart model to clearly explain the function of this powerful organ. A teacher guide and student activity workbook will be included with this workshop.

### Mad Science Programming Correlated to MS-LS1-8:

#### Tantalizing Taste

Exercise your sense of taste! Magnify your taste buds and unplug your nose. Compare flavors with your friends and try a carbonated test challenge. Sort out the scents in the Scratch 'n Sniff game!

## **MS.Matter and Energy in Organisms and Ecosystems**

### Mad Science Programming Correlated to MS-LS1-6:

#### Photosynthesis

This workshop provides students with an introduction to photosynthesis, including an understanding of the chemical processes at work in the plant, plant respiration, and the role of plants in food webs.

### Mad Science Programming Correlated to MS-LS1-7:

#### Exploring Ecosystems

Investigate the interconnections present in nature. This workshop will introduce students to the elements of ecosystems. Students will build ecosystem models, explore the elements of energy webs, reflect on how humans impact ecosystems, and use field journals for everyday explorations and more.

#### Photosynthesis

This workshop provides students with an introduction to photosynthesis, including an understanding of the chemical processes at work in the plant, plant respiration, and the role of plants in food webs.

### Mad Science Programming Correlated to MS-LS2-1, MS-LS2-3, and MS-LS2-4:

#### Life in the Sea

The ocean holds many mysteries and deep-sea creatures that seem more alien than earthly. Children learn about the vast range of life found in the sea—from plankton to sponges to whales!

## *Mad Science Programming correlated to the NGSS*

Children learn how plants and animals are adapted to their ocean habitats, and find out what humans can do to protect ocean life. Children bring the ocean home with a viewer and 3-D images of some wild underwater wonders.

### **Exploring Ecosystems**

Investigate the interconnections present in nature. This workshop will introduce students to the elements of ecosystems. Students will build ecosystem models, explore the elements of energy webs, reflect on how humans impact ecosystems, and use field journals for everyday explorations and more.

## **MS.Interdependent Relationships in Ecosystems**

### **Mad Science Programming Correlated to MS-LS2-2:**

#### **Life in the Sea**

The ocean holds many mysteries and deep-sea creatures that seem more alien than earthly. Children learn about the vast range of life found in the sea—from plankton to sponges to whales! Children learn how plants and animals are adapted to their ocean habitats, and find out what humans can do to protect ocean life. Children bring the ocean home with a viewer and 3-D images of some wild underwater wonders.

### **Exploring Ecosystems**

Investigate the interconnections present in nature. This workshop will introduce students to the elements of ecosystems. Students will build ecosystem models, explore the elements of energy webs, reflect on how humans impact ecosystems, and use field journals for everyday explorations and more.

### **Mad Science Programming Correlated to MS-LS2-5:**

#### **Exploring Ecosystems**

Investigate the interconnections present in nature. This workshop will introduce students to the elements of ecosystems. Students will build ecosystem models, explore the elements of energy webs, reflect on how humans impact ecosystems, and use field journals for everyday explorations and more.

## **MS.Growth, Development, and Reproduction of Organisms**

### **Mad Science Programming Correlated to MS-LS1-4:**

#### **Heredity**

This workshop is designed specifically for Grades 5-8. It involves a number of hands-on activities that will help students learn about such terms as heredity, traits, genes, genotype, phenotype, chromosome and cell division. This workshop includes a teacher's guide outlining activities to be performed with the class using material left behind after the workshop, and a student activity book.

## **MS.Natural Selection and Adaptations**

## *Mad Science Programming correlated to the NGSS*

### **Mad Science Programming Correlated to DCI LS4.C - Adaptation:**

#### **All About Animals**

What is an animal? Feathers, fins, fur and more! Children explore the animal kingdom and learn about habitats, anatomy and life cycles of their favorite creatures. They experiment with camouflage, and explore the amazing sounds that animals make. Children step into the shoes of a naturalist and make their own animal track cast to take home.

#### **Life in the Sea**

The ocean holds many mysteries and deep-sea creatures that seem more alien than earthly. Children learn about the vast range of life found in the sea—from plankton to sponges to whales! Children learn how plants and animals are adapted to their ocean habitats, and find out what humans can do to protect ocean life. Children bring the ocean home with a viewer and 3-D images of some wild underwater wonders.

- **MS.Space Systems**

### **Mad Science Programming Correlated to MS-ESS1-1:**

#### **Planets and Moons (NASA)**

Students set off on a voyage to discover the Solar System. Students impersonate the planets to compare their sizes and distances from the Sun, recreate a solar and lunar eclipse, and become particles on a voyage into a planet's core. Students build planetary puzzle cubes to take home; these cubes can be put together to form images that are out of this world!

### **Mad Science Programming Correlated to MS-ESS1-2:**

#### **Planets and Moons (NASA)**

Students set off on a voyage to discover the Solar System. Students impersonate the planets to compare their sizes and distances from the Sun, recreate a solar and lunar eclipse, and become particles on a voyage into a planet's core. Students build planetary puzzle cubes to take home; these cubes can be put together to form images that are out of this world!

#### **Space Phenomena**

Students will explore the phenomenal events that take place in the night sky. Children will create their own impact craters, and observe model meteors fall through a model atmosphere. After a friendly game of satellite tag designed to teach students about reflected light, students watch a model comet form right before their eyes. After exploring the composition of real comets, students will make comet balls to take home with them!

### **Mad Science Programming Correlated to MS-ESS1-3:**

#### **Planets and Moons (NASA)**

Students set off on a voyage to discover the Solar System. Students impersonate the planets to compare their sizes and distances from the Sun, recreate a solar and lunar eclipse, and become particles on a voyage into a planet's core. Students build planetary puzzle cubes to take home; these cubes can be put together to form images that are out of this world!

#### **Sun and Stars (NASA)**



## *Mad Science Programming correlated to the NGSS*

Students will investigate the Sun and distant stars, and the galaxies they form. Children will explore stellar life cycles, create new solar systems, and make their own constellations. The class concludes with a 3—dimensional exploration of the Big Dipper that students will be able to take home with them.

### **MS.History of Earth**

#### **Mad Science Programming Correlated to MS-ESS2-2:**

##### **Earthworks**

Children dig-in to Earth science! Earth's layers are introduced with a spotlight on its outer rocky layer. Children check out three rock samples to find out how they were made and where they were formed. They inspect minerals with an ultraviolet light to see them fluoresce. They model the moving plates that cause bends and breaks in the Earth's solid rock layer. Tremors are created to tip a tower, and then things get rocky with the Experi-tube Take-Home. Children can make it and shake it to see sediment settle into layers!

### **MS.Earth's Systems**

#### **Mad Science Programming Correlated to MS-ESS2-1:**

##### **Earthworks**

Children dig-in to Earth science! Earth's layers are introduced with a spotlight on its outer rocky layer. Children check out three rock samples to find out how they were made and where they were formed. They inspect minerals with an ultraviolet light to see them fluoresce. They model the moving plates that cause bends and breaks in the Earth's solid rock layer. Tremors are created to tip a tower, and then things get rocky with the Experi-tube Take-Home. Children can make it and shake it to see sediment settle into layers!

#### **Mad Science Programming Correlated to MS-ESS2-4:**

##### **Wallopig Weather**

Children get weather-wise in this climate-controlled class! A demonstration using heat sensitive paper and a flashlight brings to light the reasons for seasons. Children discover how air affects weather, and perform a test to prove that air is everywhere. Children try out tools that meteorologists use to measure weather. They create three-day weather forecasts for cities around the world and stage a statically charged indoor storm. Children take home the color-changing Sun Beads kit to detect ultraviolet light from the sun.

##### **Exploring Ecosystems**

Investigate the interconnections present in nature. This workshop will introduce students to the elements of ecosystems. Students will build ecosystem models, explore the elements of energy webs, reflect on how humans impact ecosystems, and use field journals for everyday explorations and more.

#### **Mad Science Programming Correlated to DCI ESS3.A – Natural Resources:**

##### **Super Power Sources**

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Children check out the source behind electric power by working out how to generate electricity and by using mechanical force to turn on light bulbs and fans. They search for renewable and non-renewable resources and find out what makes a battery work. Children take home a hand-crank flashlight as a renewable source of sunshine!

### **MS.Weather and Climate**

#### **Mad Science Programming Correlated to MS-ESS2-5 and MS-ESS2-6:**

##### **Walloping Weather**

Children get weather-wise in this climate-controlled class! A demonstration using heat sensitive paper and a flashlight brings to light the reasons for seasons. Children discover how air affects weather, and perform a test to prove that air is everywhere. Children try out tools that meteorologists use to measure weather. They create three-day weather forecasts for cities around the world and stage a statically charged indoor storm. Children take home the color-changing Sun Beads kit to detect ultraviolet light from the sun.

#### **Mad Science Programming Correlated to DCI ESS2.C – Ocean Currents:**

##### **Wacky Water**

Water, water everywhere! Explore the amazing properties of water – density, solvency and surface tension in this hands-on look at how water works. Build a Rescue Diver to take home to continue your underwater explorations.

### **MS.Human Impacts**

#### **Mad Science Programming Correlated to MS-ESS3-3:**

##### **Wacky Water**

Water, water everywhere! Explore the amazing properties of water – density, solvency and surface tension in this hands-on look at how water works. Build a Rescue Diver to take home to continue your underwater explorations.

##### **Black and Blue Oceans**

Students will devise and test oil spill techniques in a mock oil spill and learn all about the pollution that plagues the oceans.

### **MS.Engineering Design**

#### **Mad Science Programming Correlated to MS-ETS1-1, MS-ETS1-2, and MS-ETS1-3:**

##### **Fantastic Fliers**

Take flight into the world of aeronautics as you discover how the 4 forces of flight help things soar into the sky. Build all kinds of paper aircraft and make a Skyhawk plane to take home to continue your high flying adventure!

##### **Rocket Science (NASA)**

## *Mad Science Programming correlated to the NGSS*

Students will follow a detailed construction plan to build their very own model rockets while exploring the science of rocketry. Children will play a fun game illustrating the four forces of flight. A model rocket launch will be part of the Space Travel class.

### **Science of Security (SAL)**

Sharpen your surveillance skills with the science of security! Children discover the science and technology behind locks, surveillance systems and burglar alarms! They will use Spyglasses on short surveillance shifts to test their observational abilities. Then, they will put their security skills to the test by building their very own Secret Safe and challenging friends to crack the code!

### **Invention-ation**

Who gave us Morse code? How about earmuffs or the light bulb? Children will be guided from observation through presentation on their journey to becoming a great inventor.

### **Mad Science Programming Correlated to MS-ETS1-4:**

#### **Science of Security (SAL)**

Sharpen your surveillance skills with the science of security! Children discover the science and technology behind locks, surveillance systems and burglar alarms! They will use Spyglasses on short surveillance shifts to test their observational abilities. Then, they will put their security skills to the test by building their very own Secret Safe and challenging friends to crack the code!