The Mad Scientist Training Club

The Mad Scientist Training Club is intended to do one thing and one thing only: make kids associate "fun" with "science". This after-school club is a non-stop tirade of the most incredible and jaw-dropping science demos from every discipline that will keep students talking and reliving the experience with family and friends for days after each session. From liquid nitrogen, to hovercrafts, to elephant toothpaste, to rockets, to fire-tornados, and more, the Mad Scientist Training Club holds nothing back.

The program focuses on one demonstration each week of school and then showcases it with a lesson for specific age groups. Multiple grades can be included in this club over the course of a week and a typical schedule is: Mondays for Kindergarten and 1st graders, Tuesdays for 2nd and 3rd graders, Wednesdays for 4th and 5th graders, and Thursdays for 6th, 7th, and 8th graders. Each grade can participate and assist with the demonstration in an age-appropriate way. Examples demonstrations include:

WEATHER DEMONSTRATIONS

Whoosh Bottle There are roughly 15 pounds per square inch of air pressure pushing down on each of us every day. In this demonstration, we will explore how this pressure can be used to crush a 10-gallon water jug.

Hot Air Balloon In this activity, your students will learn about the roles that density and convection play in the flight of a hot air balloon. Your students will have the opportunity to design and construct paper lanterns and let them fly. We will end with the launch of a mylar hot air balloon!

Bernoulli Demonstration In this demonstration we will investigate how both water and air remain in our atmosphere, even though they are subject to Earth's gravitational pull. You can choose either our small- or our large-scale demonstration (see below) to observe how small particles can become trapped in rising columns of hot air, just like in our atmosphere.

Liquid Nitrogen Cloud Formation This demonstration allows your students to visually observe cloud formation in your classroom. To create the cloud, we use super cold liquid nitrogen to which we add a small amount of hot water. Because liquid nitrogen boils at room temperature, the addition of the hot water will cause it to boil even faster and will create an instant cloud. Your students will have the opportunity to create their own cloud in a bottle!

Fire Tornado When a tornado passes over the top of an active wildfire the fire can actually be pulled up into the vortex of the tornado, thus creating a fire tornado. We can demonstrate how this could happen by creating a smoke-free fire tornado right inside your classroom.

CHEMISTRY DEMONSTRATIONS

Balloonapalooza! When the temperature of air is increased or decreased its volume is altered – expanding or shrinking, respectively, in response. To demonstrate this phenomenon, we will fill several balloons with air and then place them, one at a time, inside a container of liquid nitrogen. Liquid nitrogen is very cold (-320ºF), so as the balloon enters the container the air inside the balloons will shrink dramatically, allowing us to visualize how the size is affected by temperature.

Hydrogen Explosion Hydrogen is both the most abundant element in the universe and one of the most volatile. This demonstration ignites hydrogen gas, along with magnesium, copper or other elements, to showcase the explosive nature of hydrogen with a colorful bang.

Cannon Time This activity utilizes marshmallow cannons to demonstrate how combustion can fire a projectile. We will also bring along a potato cannon—a pipe-based cannon that utilizes the combustion of a flammable gas to launch a potato at high speeds—as an additional demonstration.

Colored Flames Fireworks are colorful because they utilize the differential line emission spectra of different elements to create a vast array of beautiful colors. This demonstration will showcase the different colors that are created by different elements by exposing them to a flame.

Elephant's Toothpaste This demonstration allows your students to visualize the properties of the common antiseptic hydrogen peroxide (H_2O_2) by watching it rapidly expand as it breaks down into oxygen (O_2) and water (H_2O).

ROCKET DEMONSTRATIONS

Alka-Seltzer Rocket Design In this activity your students will design rockets using film canisters. Once the rockets are complete, water and Alka-Seltzer will be added to each and then, as the amount of carbon dioxide (CO_2) gas inside the canister rises, it will increase the pressure inside until it pops the end and the canister is launched right inside your classroom.

Piezo Rocket Design Piezoelectricity is the electric polarization in a substance that results from the application of mechanical stress and it is a fascinating way of turning mechanical energy into electrical energy. To demonstrate this concept the resulting electrical discharge will be used to create hand held rocket launchers.
***Note**: this demonstration must be done outdoors*

2-Liter Bottle Rocket Design This activity allows your students to explore Newton's Third Law and aerodynamics by designing and launching 2-liter bottle rockets.

Trash Can Rocket This demonstration harnesses the power of liquid nitrogen to create a rocket launch.
***Note**: this demonstration must be done outdoors*

BIG DEMONSTRATIONS

Ball Pit Explosion We fill a large rubber container with water, a sealed 2-liter bottle of liquid nitrogen, and a bunch of colorful plastic balls. Because the liquid nitrogen boils at room temperature it will begin to boil inside the bottle and release nitrogen gas. Once the nitrogen gas pressure has sufficiently increased it will cause the bottle to explode, releasing liquid nitrogen into the water and subsequently causing the balls to fly out of the container.
***Note:** this demonstration must be done outdoors*

Soap Bubble Monster A larger rubber container is filled with liquid nitrogen and hot soapy water is poured on top of it. Because liquid nitrogen boils at room temperature it will boil even faster once the hot water is added, which will result in a unique explosion.
***Note:** this demonstration must be done outdoors*