School Age Workshops

PHYSICAL SCIENCES

- ***Detective Science***
  - Children are introduced to the science techniques used to investigate and analyze crime scene evidence. The children begin their training by observing a fictional crime scene. Their inquiry continues with a mystery powder analysis, fingerprint examination, ink separation investigation, and teeth impression match-up. They create a composite of a perpetrator from memory and then analyze all the evidence to determine which suspect committed the crime.
- ***Spy Academy***
  - Look out 007- the Mad Science Spy Academy is in session! Use edible messages and other ways of secretly communicating as the children decode clues to journey into the world of espionage. Communicate like a real spy with your Secret Code Breaker take-home.
- ***Agent Undercover***
  - Calling all agents! Get into gear with Agent Undercover and learn more about what it takes to be successful in the spy world. Children learn about night-vision, audio surveillance and even create their own Spy gadget. Step into the shoes of a spy in action with your Undercover Observer take-home.
- ***Crime Lab***
  - Analyze clues and get hot on the trail of a crime suspect in our Mad Science Crime Lab. Children experiment with chromatography and learn how to analyze different liquids and scents. Continue the fun at home with your very own Spynoculars.
- ***Discover Detection***
  - Step into the shoes of a detective—uncover the science involved in evidence gathering and analysis. Students will create, collect, and analyze evidence and discover what skills are necessary as a crime scene lab technician. Continue the learning with a Case Stamper.
- ***Funky Forensics***
  - Figure out the science of forensics in this hands-on look at crime scenes. Evidence collection and puzzle making will lead them to understand why forensic scientists like to understand the complete picture before they make decisions. Students continue their sleuthing at home using their Scene Solver take home to reconstruct the scene of a crime with family and friends.
- ***Kitchen Chemistry***
  - Children are introduced to the differences between chemical and physical reactions. The children test food samples for

starch and protein and learn that certain foods help us grow, develop, and function. They familiarize with digestion— the process that occurs after they eat.

- ***Science of Toys***
    - Children are introduced to the science of toys through toy-themed centers. Both familiar and novel gadgets are investigated. They discover how motors make toys move, and play with tops to learn about potential and kinetic energy. Balancing toys are used to familiarize children with the center of gravity. They find out that opposite poles attract each other when experimenting with magnetic toys.

- ***Mad Machines***
    - Mad Machines introduces basic physical science. Children investigate mechanics and the role that they play in our everyday lives. Children learn about forces and work, and discover that simple machines make work easier by allowing us to push and pull less strenuously, but over a longer distance.

- ***Movie Effects***
    - Movie Effects is an exciting introduction to the science involved in the spectacular special effects and technology that are behind motion picture magic. Children learn the science applications in filmmaking, from the chemistry of movie snow, to the acoustics of Foley artist sound effects, to the optics of 3-D technology.

- ***Slime Science***
    - Slime Time provides an entertaining lesson on polymers and their properties. These relatively complex chemistry concepts are introduced to elementary school-age children in tactile, visually-engaging experiments. Students create cross-linked polymers based on their observations of the properties of polymers and cross-linking agents.

- ***Optical Illusions***
    - Children are introduced to the concepts of refraction, science of optics, and biology associated with sight. The instructor uses a wide variety of optical illusions like the mirror mirage, twisting coils, and convex and concave mirrors to demonstrate how physics can trick our eyes. Children use erasable crayons to create a series of laminated paper illusions and explore the reflections of various mirror forms.

- ***Sonic Sounds***
    - Music and all sorts of merry sounds engage children in sound experiments and live demonstrations showing the properties and transmission of sound waves. Children listen to sounds made with solid materials— from

plastic, to metal, to string. Ordinary objects like handheld horns, metal screws, wooden ratchets and beads transform into a story sound-effect symphony. Electronic devices reveal frequency when a pitch-changing machine alters the children's voices to gruff monsters or happy chipmunks.

- ***Magnetic Magic***
  - Children learn how and why magnets behave by testing the basic physical principles governing magnetism. They learn how to create magnets and how magnetism is lost. Children use compasses to gain a better understanding of how humans benefit from the Earth's magnetic force. Hands-on experimenting— from swinging compasses to motorized devices— allows children to explore the role of magnetism in our everyday lives.

- ***Tantalizing Taste***
  - This workshop is an excellent introduction to the taste and smell senses. Children count the taste buds on their tongues to learn about taste sensitivity. The instructor leads a discussion about how taste changes as we age. A flavorful experiment teaches children how to examine scented test tube samples. Children observe carbonation and taste test-cola creations.

- ***Harnessing Heat***
  - This class introduces children to the physical facts about heat. Children learn how molecules move at different temperatures and how thermometers work. The instructor uses various tools like a heat gun and thawing blocks to demonstrate how we use temperature-sensitive equipment in our everyday lives. A series of interactive heat-induced experiments show how the hot and cold we feel is relative. Shaking up a bottle of sand shows how friction increases temperature. Children explore materials that transfer heat at different rates.

- ***Lights, Color, Action***
  - Enter the world of light and color. Exciting experiments on white light including color-wheel blending and prism-splitting spectrums introduce Newton's color theory concepts. Children learn the differences between mixing colored light and mixing colored paint. Activities involving spectroscopes, ultraviolet light, and chromatography provide lessons on scientific techniques used to study the physics of light.

- ***Watt's Up***
  - Children have a solid introduction to the properties of electricity and electric charges. Children discover an electric charge's basic

properties, learn to distinguish between static electricity and electrical current, and explore the science behind these phenomena. Hands-on activities provide a tactile lesson in charging and discharging objects with static electricity. Children will be able to relate a newfound understanding of lightning and static-electric shocks—that may have previously been confusing or even frightening—to their daily lives. They will learn how to protect themselves from electric shocks and lightning.

- ***Super Structures***
  - Calling all junior engineers! Super Structures is a fantastic introduction to some of the concepts, terms and ideas behind engineering and architecture. Test out the basics of architectural design and structural engineering in this hands-on class about structures. Explore how triangles, arches and bridges shape our structures and apply some engineering to your very own bridge.

- ***Super Sticky Stuff***
  - Students will be given the opportunity to perform inquiry-based experiments to test the properties of adhesive objects. They will develop an understanding of the science of sticky elements and practice hands-on activities to explore the nature of *natural* and *synthetic* adhesive materials.

- ***Invention-ation***
  - This workshop introduces children to how inventors work and that many inventions happen by accident. Through a hands-on approach students will learn that anyone, of any age can be an inventor.

- ***"Current" Events***
  - This electrifying class teaches the fundamentals of current electricity. Children explore electrons and cooperate to create real series and parallel circuits. A bursting balloon illustrates how a fuse works, and children test their knowledge of what conducts with a conductivity tester. Newfound expertise helps them decipher the hidden connections in an inference box.

- ***Wacky Water***
  - Wacky Water introduces children to the properties of water. Children explore this fascinating fluid's many facets including density, water as the universal solvent, water pollution, and wave motion. Water is a remarkable substance. It covers more than ¾ quarters of Earth's surface—and no life on Earth could survive without it. Yet, besides water's two other states (steam and ice), children

know little about it's other properties.

- ***Super Power Sources***
  - Super Power Sources is an interactive exploration of alternative energy. Children learn about power generators and separate renewable from nonrenewable resources. Heat from artificial sunlight melts a wax figurine. Children use their breath to run wind turbines, power solar cells by teaming up with flashlights and witness a fuel cell turn water to electricity. They assemble chemical battery components to power a fan and try their hand at filling a hand crank flashlight's capacitor.

- ***Science of Magic***
  - Discover how magical science can be and the science behind some basic magic tricks! The *Science of Magic* is a unique class. It aims not to introduce children to any particular scientific area, concept, or theme, but to challenge the children to think logically, and therefore, scientifically. Hopefully, "How did they do that?" will become the initial question that children will ask themselves, not only when watching a magic show, but also when simply observing the fascinating world around them. Children's natural curiosity provides the perfect stepping stone for understanding magic.

- ***Fun-damental Forces***
  - Students will find out what makes the world go 'round in an entertaining introduction to the concepts and basics of forces. Gives students a vivid and concise understanding of what makes the universe tick: gravity, inertia, centrifugal force, and centripetal force. Children will encounter and experiment using their own force of gravity. Students will visit four work stations to learn and experiment with gravity, precession, centrifugal force, and centripetal force.

- ***Fantastic Fliers***
  - Fantastic Fliers is an ideal combination of practical and theoretical knowledge, and the perfect introduction to the basics of aerodynamics. Students will learn about the four forces which affect a plane in flight: drag, gravity, lift and forward thrust; and they will witness, experience, play with, and use these forces to their advantage in the construction of incredible paper planes!

- ***Under Pressure***
  - Under Pressure introduces children to the exciting science of aerodynamics and a host of associated scientific concepts including air pressure, the science of flight, Bernoulli's Principle, Newton's Laws of Motion, and thermodynamics. Students will be challenged to stop and consider air, its effects on our surroundings,

and its significance to us and to life on earth.

- ***Che-Mystery***
  - Besides exploring and explaining a variety of chemical processes and phenomena, Che-Mystery introduces students to this exciting, vital science—its importance in our daily lives, and its role behind the scenes in many everyday and not-so-everyday phenomena!

- ***Radical Robots***
  - Radical Robots reinforces the concept that science and technology go hand in hand. Real robots are devices that operate automatically with humanlike skill. They have internal systems comparable to humans. Children discover how robots work in our place and are introduced to several real-life examples such as the Canadarm. Children move through learning centers to test and differentiate between robots, automatons, and remote control devices. They learn how robotic devices use sensors to learn about their environment. Children build and take home a mechanical robot hand.

- ***Energy Burst***
  - Children are introduced to the law of conservation of energy. Several energy forms are explored with a focus on potential (stored) energy and kinetic (motion) energy. Children do hands-on experiments to learn that elastic objects store potential energy when stressed and release kinetic energy when returned to their original shape. Children lift balls against the force of gravity to learn about gravitational potential energy. They build and take home a catapult that stores energy in a wound string.

- ***Moving Motion***
  - Moving Motion introduces children to Sir Isaac Newton's three laws of motion. Performing hands-on experiments helps them learn that objects tend to stay in motion or remain at rest unless met by an unbalanced force. Children investigate and learn that objects with more mass require more force to move. They learn that for every action force there is an equal and opposite reaction force through a variety of volunteered-powered demonstrations.

- ***Junior Reactors***
  - In this class, 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. This class provides a basic lesson on the atomic make-up of matter.

- ***Lab Works***
  - Students become lab scientists-in-training in this

whirlwind program on laboratory techniques! Each student will learn to manipulate an assortment of lab equipment in a series of hands-on activities. This program introduces the basic tools and techniques that scientists use in the laboratory. The students will develop their scientific vocabulary and fine-motor skills as they learn to manipulate instruments scientists have created for lab work.

- ***Ph Phactor***
  - Children are introduced to the concept of pH, acids, and bases. These concepts are applied using household items to improve children's understanding of the nature and purpose of the chemicals they often encounter. They learn how household chemicals are safely handled.

- ***Chem in a Flash***
  - This class introduces the factors which determine chemical rates of reaction. Several fields of chemistry will be presented, and students will explore the many ways in which different chemical processes can be sped up through the use of catalysts.

- ***Dry Ice Capades***
  - Children will understand the concept of matter in its three states through visual and tactile experiences. They will learn both how and why matter changes between the different states and develop a good understanding of matter's elementary physical principles. *Dry ice*—the star of the show—used in a series of tests, under the guidance of the instructor, explores the properties of matter at extreme temperatures.

- ***Where's the Air***
  - This workshop introduces the concept of air pressure through hands-on activities that encourage students to interact with the principles of air pressure. They are given the opportunity to apply this knowledge while experimenting with their own flying devices.

- ***The Glow Show***
  - This class concentrates on how we perceive light and its effect on objects. This class introduces children to the luminescent properties of natural and synthetic materials. These concepts will be presented through a hands-on exploration of household objects, paper products, and earth minerals. The children will be given a brief history of fluorescence followed by a demonstration of chemiluminescence, the chemical aspect of luminescence.

- ***Science of Art***
  - What do science and art have in common? This class will provide students with an

opportunity to explore what these two disciplines have in common and what features are important to both artists and scientists. Students will learn how art forgeries are detected by chemistry and physics. They will also learn how colors combine both scientifically and artistically to create a work of art. The children will learn all about distorted images and will even get to take one home and try to draw their own.

- ***"Matter" of Fact***
  - This workshop introduces children to the structure of atoms and molecules. Students will learn how atoms combine to create molecules, and will examine molecules and molecular bonding using molecular models. Through a hands-on approach, students will learn and observe the difference between physical and chemical changes. Finally, students experiment with the chemical reactions resulting in the creation of Mad Science Putty®.

- ***Get Connected***
  - Children check out telecommunication technology and assemble sound wave-making devices. They set-up telephone networks and learn about frequencies on walkie-talkies and cell phones. An active, role-playing game introduces how cell towers relay signals and demonstrates cell tower triangulation techniques to locate cell phone users. A fast-paced quiz game gives children a telecommunication history overview.

- ***Mix It Up***
  - This class challenges children to branch out into the physical aspect of chemistry. A discrepant event involving immiscible liquids and beads with different densities introduces the concept of mixtures. Children identify mixtures in bottles as solutions, suspensions, or physical mixtures. They use flashlights to differentiate between suspensions and solutions. The instructor demonstrates the difference in molecular movement between hot and cold water and uses a pH indicator to show an acid–base buffering reaction. The children separate mixtures with mechanical and chemical techniques.

EARTH/SPACE SCIENCES

- ***Black/Blue Oceans***
  - This workshop introduces students to environmental issues relating to our water system. Through a hands-on approach students explore the effects of, and difficulties in cleaning up oil spills.

- ***Dinosaurs***
  - Investigating the habits, needs and characteristics of dinosaurs facilitates the exploration of the

fossilization process. Hand-on activities assist students with their understanding of fossils and dinosaurs.

- ***Walloping Weather***
    - Children conduct hands-on experiments to understand how and why weather occurs. They find out that seasons change as the Earth tilts toward and away from the sun. Children learn that air affects weather. They perform experiments to prove that air has mass and takes up space. After learning that water in the air affects the weather, children recreate the water cycle and mimic a rain cloud. They try out meteorology measurement tools and act like weather reporters. Children learn that ultraviolet light can cause sunburns.

- ***Earthworks***
    - Children are introduced to the science of geology. They examine three different rock types and learn how and where they formed. Children investigate tectonic plates and learn how their movements cause stress on the Earth. They discover that these movements cause stress on Earth. They discover that these movements can cause mountains to form, earthquakes to occur, and volcanoes to erupt.

- ***Mineral Mania***
    - This workshop provides students with an introduction to geology, including an understanding of the geological formation processes, classification systems, identification methods, and physical properties of rocks and minerals.

- ***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.

- ***Space Phenomena***
    - Space Phenomena introduces students to phenomenal space events. Students investigate asteroid impacts and meteors, learn to differentiate the lights of airplanes from those of satellites, and explore the composition and nature of comets!

- ***Living in Space***
    - Children will explore the various demands and challenges facing astronauts, and the scientists who send them into space. Students then investigate astronaut training, mobility, and life support, and experience astronaut life for themselves as they participate in a construction chamber mission.

- ***Atmosphere and Beyond***

- Students will discover the properties of the air around us and explore the atmosphere of Earth, and those of planets beyond. Students will gain an understanding of the importance of our planet's atmosphere for life on Earth, and compare the composition of Earth's atmosphere with those of other planets in the solar system.

- ***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.

- ***Sun and Stars***
  - Teaches children about stellar life cycles, how stars affect planetary formation, and about the various kinds of galaxies. Children will also investigate the perception of stars from Earth as they examine constellations in three dimensions.

- ***Space Technology***
  - Introduces students to space-related technologies, including those used on Earth to aid space exploration and the very scientific principles of space travel.

- ***Space Travel***
  - Students will learn about the propulsion systems employed for space travel. Will introduce children to the concepts of thrust, propulsion, action/reaction, aerodynamics, rocket construction, the stages of rocket flight, and more!

LIFE SCIENCES

- ***Seeking Our Senses***
  - This workshop is an introduction to how our five senses work and function and the ways in which we use them in our everyday lives.

- ***Bugs!***
  - Children are introduced to the world of entomology. Examining real specimens and models help children familiarize themselves with insect anatomy. They discover that insects have specific body parts that set them apart from other arthropods. An insect habitat match-up helps children understand how insects adapt to their environment. They learn how insects defend themselves and pollinate plants.

- ***Mission Nutrition***
  - Children are introduced to the basics of nutrition including the role of carbohydrates, proteins, and fats. They will gain an understanding of how food provides energy for the body and how exercise plays an important role in energy levels. The program increases the children's nutritional knowledge, stimulates

enthusiasm for personal health, and encourages a healthy attitude toward nutrition and fitness.

- ***Life in the Sea***
    - Life in the Sea introduces children to the diverse wealth of life beneath the ocean's waves. Children learn to distinguish fish from invertebrates, and explore some of the adaptations sea creatures have developed for survival. Real shark and whale tooth replicas let children get hands-on with marine biology. Group games help them explore the concepts of food webs and sustainable fishing practices. They also learn some things they can do to help protect ocean creatures and habitats.

- ***All About Animals***
    - Free alternate take-home
    - All About Animals teaches children about the incredible, diverse life in the animal kingdom. Children learn how animals are adapted to their different habitats through specialized feet, fur, and feathers. Real tooth and claw replicas provide hands-on experience with the science of zoology. Activities about classification, camouflage, and animal life cycles introduce the diversity of animals on earth. Children step into the shoes of a naturalist as they create their own casts of animal tracks to take home.

- ***Be Tobacco Free***
    - This workshop introduces students to the danger of using tobacco products.

ROCKETS

- ***Rocket Building***
    - 90-100 minutes
    - Additional cost for extra time
    - Rocket Demonstration