SCIENCE SURPRISE

PROGRAM MANUAL

Bugs!

Detective Science

Earthworks

Kitchen Chemistry

Mad Machines

Movie Effects

Science of Toys

Walloping Weather

BUGS!

SUMMARY:
Children get engrossed in entomology! They find out that insects are arthropods and inspect authentic insect specimens. Insect anatomy is introduced and examined up-close. A container of creepy crawlers is divided into insects and non-insects. An ultraviolet powder demonstration lights up the truth on how insects spread pollen. Children learn how insects adapt by building insect puzzles at habitat stations. They examine a bag of insect defense representations and choose the one they want. An Insect-A-Vision Take-Home kit allows the junior entomologist to get bug-eyed at home!

EDUCATIONAL VALUE:
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. Children see from an insect's point of view with an interchangeable lens viewer to take home.

TAKE-HOME MESSAGE:
1. Insects are part of the arthropod group.
2. Insects have a head, thorax, abdomen, and six legs.
3. Insects see differently than us.

AFTER-SCHOOL PROGRAM

DETECTIVE SCIENCE

SUMMARY:
Children use science to crack a case! The crime happens just before the Bustertown bake-off. Mr. Baker's big, fat, chewy, chocolate chip cookie is sabotaged and his recipe is stolen. The case kicks off with a crime scene investigation. The children examine fingerprints, mystery powders, ink samples, and DNA evidence. They also practice their memory skills to create a composite! Analyzing all the evidence is what helps pinpoint the perpetrator. The children take home a Personal Profile kit. They can use it to record their own fingerprints and other important information.

EDUCATIONAL VALUE:
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 DNA evidence analysis. They create a composite of a perpetrator from memory and then analyze all the evidence to determine which suspect committed the crime. They take home a kit to record their own vital information.

TAKE-HOME MESSAGE:
1. Detectives observe and ask questions.
2. Forensic scientists test evidence.
3. We all have unique fingerprints.

AFTER-SCHOOL PROGRAM

EARTHWORKS

SUMMARY:
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 can cause mountains to form, earthquakes to occur, and volcanoes to erupt. They assemble a sedimentary stacker to show off their rock-solid knowledge of earth science at home.

EDUCATIONAL VALUE:
Children get a taste for earth science and engineering with hands-on demonstrations and modeling challenges. After acting out the layers of the Earth they examine the crust's rock cycle and compare the properties of different rock types. Modeling the movements of tectonic plates demonstrates the powerful stresses that cause earthquakes, volcanic eruptions, and mountain formation. An engineering marvel reveals a technique to protect buildings from tremors. They assemble a sedimentary stacker to shake up and settle some sediments at home.

TAKE-HOME MESSAGE:
1. We live on the top layer or crust of the Earth.
2. Most volcanoes and mountains form where the edges of two crust pieces meet.
3. We can design buildings that will survive an earthquake.

KITCHEN CHEMISTRY

SUMMARY:
Children get clued-in to the chemical reactions that occur when they prepare, analyze, and digest their food. The class gets cooking with a balloon blow-up demonstration that helps them discover what makes dough rise. Children sort common kitchen activities into chemical and physical reactions. They learn about the nutrients that fuel our bodies, and test food samples in search of starch and protein. The Digestor Inspector Take-Home lets them discover what happens after they eat and digest nutrient-rich foods.

EDUCATIONAL VALUE:
Children are introduced to the differences between chemical and physical reactions. The instructor demonstrates how yeast feeds on sugars to produce a gas-filled balloon, and compares this with other leavening techniques. The children test food samples for starch and protein and learn that certain foods help us grow, develop, and function. They explore the process of digestion—the process that occurs after they eat. The hands-on, clear digestive-tract model extends this concept at home!

TAKE-HOME MESSAGE:
1. Chemical and physical changes happen in the kitchen and in our bodies.
2. The food we eat gives us energy and helps us move and grow.
3. Digestion is how our body breaks down and uses the food we eat.

MAD MACHINES

SUMMARY:
Children discover how simple machines make our lives easier. They learn about the six different types of simple machines: the screw, lever, inclined plane, wedge, pulley, and wheel and axle. Children launch with levers, secure with screws, and work with wedges through hands-on activities! A large, child-operated pulley system demonstrates how pulleys help us move heavy objects easily. Children apply their newfound mechanical knowledge by building their very own Drag Racer Take-Home!

EDUCATIONAL VALUE:
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. They will extend this concept at home with the Drag Racer, a car model complete with wheels and axles.

TAKE-HOME MESSAGE:
1. Simple machines make work easier.
2. The six simple machines are the screw, lever, inclined plane, wedge, pulley, and wheel and axle.
3. All complex machines have simple machines in them.

MOVIE EFFECTS

SUMMARY:
Movie Effects gives children a chance to sit in the director's chair and discover why science is the real star on the big screen. Exciting demonstrations and hands-on activities allow children to discover the science behind the amazing effects from their favorite movies. Children investigate 3-D technology, and experience how this effect can make them feel like part of the action. Motion pictures come alive with a spinning praxinoscope. Children use the Cartoon Creator to make their own mini movie flipbooks that they can take home.

EDUCATIONAL VALUE:
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.

TAKE-HOME MESSAGE:
1. Our brains see a series of still pictures as moving objects.
2. Science helps create special effects for movies.
3. Things seem to jump out in 3-D movies because two pictures overlap.

AFTER-SCHOOL PROGRAM

SCIENCE OF TOYS

SUMMARY:
Children play with toys to explore physics concepts. They play, and ponder over what makes toys work. There is fun in flipping, balancing, and spinning toys. They will work with gears and magnets to make things move, and even create a circuit with the human touch. The class winds down with a Yo-yo Take-Home.

EDUCATIONAL VALUE:
Children are introduced to the science of toys through toy-themed centers. Both familiar and novel gadgets are explored. They wind up motors to make toys move, and play with tops to learn about potential and kinetic energy. Balancing toys demonstrate the center of gravity. And toys with magnets attract and repel, all in polar fun. Their physics exploration continues at home with the Mad Science Yo-Yo.

TAKE-HOME MESSAGE:
1. We can play with toys to find out how they work.
2. We can use science to explain how toys work.
3. Some toys use stored energy to move.

AFTER-SCHOOL PROGRAM

SCIENCE SURPRISE

WALLOPING WEATHER

SUMMARY:
Children get weather-wise in this climate-controlled class! A demonstration using heat sensitive paper and a heat lamp 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.

EDUCATIONAL VALUE:
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. They make and take home a color-changing ultraviolet light detector.

TAKE-HOME MESSAGE:
1. Air is all around us. Air forms our atmosphere.
2. Heat from the sun causes changes in the air. Air changes affect the weather.
3. Meteorologists study weather so that they can predict changes.