



PROGRAM MANUAL

All About Animals
Energy Burst
Get Connected
Life in the Sea
Mix It Up
Moving Motion
Radical Robotics
Super Power Sources





ALL ABOUT ANIMALS

SUMMARY:

All About Animals brings children into the amazing animal kingdom! Children learn about diverse, astounding creatures on earth as they experiment with camouflage and get hands-on with real tooth and claw replicas. Children see what's inside animals and discover which animals are truly spineless! Organizing a wide range of creatures teaches how scientists classify everything from elephants to arachnids. The real circle of life is revealed as children explore and compare animal life cycles. The Cat Camouflage Take-Home lets children experiment with adaptations to learn how predators hide from their prey.

EDUCATIONAL VALUE:

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 rich diversity of animal life on earth.

TAKE-HOME MESSAGE:

- 1 Animals are living things that can move and eat.
- 2 Animals must eat other living things to survive.
- 3 Animals have adaptations that help them live in their habitats.



ENERGY BURST

SUMMARY:

Children spring into action to reach their potential in this energetic class! They explore mechanical energy as they experiment with toys that stretch, roll and fly. There is time to unwind as they experiment with wind-up toys that hop and flip. A radiometer sheds some light on the concept of energy transfer. A drop test reveals how gravity affects the energy of falling objects. At the end of the class, children build a Catapult model that they can take home to continue their investigations into potential and kinetic energy.

EDUCATIONAL VALUE:

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 try a variety of hands-on experiments. They learn that elastic objects store potential energy when they are under tension, and release kinetic energy when they return to their original shape. Lifting and dropping balls helps them learn about gravitational potential energy. They build and take home a catapult model that stores energy in a wound string.

TAKE-HOME MESSAGE:

- 1 In physics, we do work to give objects energy.
- 2 Potential energy is stored, and kinetic energy makes things move.
- 3 Energy cannot be created or destroyed.



GET CONNECTED

SUMMARY:

Children take on telecommunications in this one-hour class! Interactive activities include seeing the sound of your voice and working out communication lines. Children chat on their own telephone network, swing around radio signals, wind through a cell tower relay, and learn how to triangulate cell phones. Children show off their telecommunication knowledge with a worldwide optic fiber Wired World Take Home product.

EDUCATIONAL VALUE:

Children explore the technological devices that we use for long-distance communication. Demonstrations introduce the concept of converting energy from one form to another. They learn how we have harnessed the electromagnetic spectrum and how we send signals over certain frequencies. Interactive activities give children the opportunity to explore sending signals through various media. Children go home with a communication challenge!

Take Home MESSAGE:

- 1 Energy can travel as electromagnetic waves.
- 2 The light we see is one section of these waves.
- 3 Humans made tools to create and to detect these waves.



LIFE IN THE SEA

SUMMARY:

Life in the Sea plunges children into the depths of ocean life. Children explore different ocean ecosystems and learn about life in the sea. Classifying creatures from sharks to sponges gives them a taste of ocean diversity. They compare shark and whale teeth and measure the size of these incredible predators. Hands-on activities teach the interconnectedness of an ocean food web, and the consequences of pollution and overfishing. The Anaglyph Sea Puzzle Take-Home lets children take some 3-D sea creatures home with them.

EDUCATIONAL VALUE:

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. The 3-D ocean images and puzzle they take home will reinforce their learning and help them remember the incredible diversity of ocean life.

TAKE-HOME MESSAGE:

- 1 Sea animals have adaptations to live in the water.
- 2 Ocean life is linked in a food web.
- 3 The ocean is important for human life.



MIX IT UP

SUMMARY:

This class challenges children to branch out into the physical aspect of chemistry. A four-layer mixture shakes up the idea of water and solutions. Children pick up concepts of homogeneous and heterogeneous mixtures, and learn to sort physical mixtures from solutions. Colorful demonstrations and salt-versus-soap experiments bring real-world connections to the class. There is a tool-time event to separate mixtures into their components. Children receive Super Sorters – a mixture sorting kit – to take home at the end of the class.

EDUCATIONAL VALUE:

Discrepant events and comparison tests provide children with memorable experiments to learn about mixtures and solutions. Children are given tips and guides to identify mixtures based on their physical properties. The instructor uses color to visualize the movement of molecules in hot and cold water, and also relate color to an acid–base buffering reaction. The children explore tools to separate mixtures. They take home a Super Sorter kit to continue collecting their chemical knowledge.

TAKE-HOME MESSAGE:

- 1 We use various mixtures in our everyday life.
- 2 We use chemicals to keep mixtures blended.
- 3 We use tools to separate mixtures.



MOVING MOTION

SUMMARY:

Children get moving with Newton's three laws of motion! They yank a cloth from under dishes and send crash test dummies flying to discover inertia. They adjust the mass of two identical cars and learn how heavier objects need a bigger push to move the same distance. They explore gravity in a hands-on drop test—and find out whether heavy and light objects really do hit the ground at the same time. A fan-powered cart shows them an action–reaction pair at work as it races across the room. Curiosity soars to new heights with the Super Copter Take-Home.

EDUCATIONAL VALUE:

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 acted on 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. Children take home an elastic-powered copter to demonstrate Newton's third law of motion.

TAKE-HOME MESSAGE:

- 1 It takes an outside force to change an object's motion.
- 2 It takes more force to move objects that have greater mass.
- 3 When an object is pushed, it pushes back with an equal and opposite force.



RADICAL ROBOTICS

SUMMARY:

Children become wrapped up in the world of robotics! After introducing robotic pets as every day technology, this class moves through the components that make up robotic devices. Children test the triggers for sensors. They act out robotic brains, and then build an end-effector to model the tools used by robots to carry out tasks. Children learn to control these Robot Hands before taking them home.

EDUCATIONAL VALUE:

Radical Robotics reinforces the concept that the technology we design and build are used in our everyday lives. Children learn about the three elements common in all robotic devices: sensors, microprocessors, and effectors. They test ways that sensors detect the robot's environment. They take on the roles of automatic, remote controlled, and programmable robots. The class wraps up as children build and take home a model robotic end-effect, a mechanical robot hand.

TAKE-HOME MESSAGE:

- 1 Robots sense, then think, then act.
- 2 We use robotic devices every day.
- 3 Robot depend on humans to program their actions.



SUPER POWER SOURCES

SUMMARY:

Children embark on a quest for alternative energy sources. They assemble a chemical battery and connect a circuit model to see how electrons flow. Tight teamwork turns on solar devices and a united breath of air runs a fan-powered light bulb. They act as power hunters to pinpoint renewable and non-renewable resources. Children pick up on the concepts of mechanical turbine power and take home Crank'n Shine, a handcrank flashlight.

EDUCATIONAL VALUE:

Super Power Sources is an interactive exploration of alternative energy. Children learn about power generators and separate renewable from non-renewable resources. Children harness the air to run wind turbines. They assemble chemical battery components, observe the measured voltage in a series circuit, and then try their hand at filling a handcrank flashlight's capacitor. Children will receive a handy flashlight as a take-home!

TAKE-HOME MESSAGE:

- 1 Moving electrons make power.
- 2 We get power from many sources.
- 3 If we use less electricity then we would need less power plants.