

FULL STEAM AHEAD

BY LISA AIMEE STURZ

Have you ever considered creating a puppet show based on specific curriculum goals? Have you ever dismissed the idea because you felt insecure about your academic prowess? Were you stunned by the complexity or unsure how to begin? If so, I appeal to your sense of adventure and encourage you to welcome the challenge and move full steam ahead.

STEM is the new buzzword in education. This acronym refers to interdisciplinary curriculum emphasizing Science, Technology, Engineering and Mathematics in an applied approach. STEM education gained popularity in 2006 after the National Science Foundation met to address its perception that we need a better-trained workforce to meet the demands of our burgeoning high-tech society. Since then, there have been government initiatives to emphasize STEM learning. In 2012, President Obama announced block grants to states embracing the new approach. I recently heard a broadcast on NPR about STEM learning in pre-schools.

Some school systems slip Arts into the mix, changing the acronym to **STEAM**. STEAM has quickly become a specialized track within many of the nation's arts councils, booking conferences, and showcases. Fueled by these directives, Red Herring Puppets added a show about electricity to our touring repertoire.

TRAIN OF EVENTS

In 2010, an elementary school asked me to design and implement a residency supplementing fourth grade science education. I was engaged to work with three classes averaging twenty students each. I created a three-part script that included a puppet character and speaking part for each one of the sixty students. I was expected to address these specific NC fourth grade science standards:

Competency Goal 3: The learner will make observations and conduct investigations to build an understanding of magnetism and electricity.

Objectives

3.01 Observe and investigate the pull of magnets on all materials made of iron and the pushes or pulls on other magnets.

3.02 Describe and demonstrate how magnetism can be used to generate electricity.

3.03 Design and test an electric circuit as a closed pathway including an energy source, energy conductor, and an energy receiver.

3.04 Explain how magnetism is related to electricity.

3.05 Describe and explain the parts of a light bulb.

3.06 Describe and identify materials that are conductors and nonconductors of electricity.

3.07 Observe and investigate that parallel and series circuits have different characteristics.

3.08 Observe and investigate the ability of electric circuits to produce light, heat, sound, and magnetic effects.

3.09 Recognize lightning as an electrical discharge and show proper safety behavior when lightning occurs.

I learned how to wire a lighting instrument in a technical theatre class forty years ago, but teaching electricity felt overwhelming and a bit presumptuous. My only comfort was that most fourth graders probably knew less than me. I began by familiarizing myself with their assigned textbooks. To my delight, I discovered that colorful characters from different cultures populate our collective knowledge about magnetism and electricity. The subject is ripe with historical costumes, foreign accents, egomaniacs, humorous failures, unexpected coincidences and stunning revelations – tasty ingredients for a puppet show.

I structured the story chronologically to emphasize the scientific method of careful observation, experimentation, and the augmentation of previous discoveries. The students were enthusiastic and cooperative. They conducted experiments in science class and created working props to use in the performance. They learned lines and researched their specific characters. The residency was considered a huge success based on the fact that students' retention and understanding of the science objectives was measurably increased.



ALL ABOARD

With this experience under my belt, I began to condense the material into a practical two-person touring show for Red Herring Puppets that supported curriculum while maintaining theatrical integrity.

I enlisted the help of Laura Bochner, Education Specialist at the Colburn Museum. She and I sifted



TEXT: Dr. William Gilbert discovers similarities between electricity and magnetism and hypothesizes that Earth has an invisible magnetic field.

SUBTEXT: Queen Elizabeth I receives magnetic treatments for arthritis and is "attracted" to the brilliant doctor.



TEXT: Thomas Edison and Lewis Latimer test thousands of plant and mineral fibers searching for a suitable filament until they are ready to pull their hair out (which they do and then test as a possible filament).

SUBTEXT: Perseverance. Edison remarks, "Don't give up; success is within our grasp. Genius is only one percent inspiration, and ninety-nine percent perspiration. We now know over ten thousand ways in which a light bulb won't work."



TEXT: Nikola Tesla demonstrates remote control, alternating current, and neon tubes while explaining atomic particle theory to his pigeons.

SUBTEXT: Tesla's brilliant accomplishments are fueled by his eccentricity and inner life.

through the myriad of possibilities to choose events that best defined the overall concept in a way that is accessible for young minds.

There were some obvious choices like Benjamin Franklin's iconic kite experiment, and Thomas Edison's incandescent light bulb. We included scenes that provided multi-cultural interest and fun costuming possibilities like Huang-ti and Queen Elizabeth I. We injected playfulness and humor by adding animal characters. For example, the Greek shepherd Magnus discovers magnetism while climbing on magnetite to herd one of his sheep. His feet stick to the rock because his sandals have iron tread. The mathematician Thales observes static electricity when a furry rabbit rubs her butt against an amber rock. We included the eccentric Nikola Tesla because frankly, he is too often overlooked in mainstream curriculum – and he is so dang cool.

We reference current concerns about non-sustainable energy usage and advocate for green alternatives such as windmills, solar power, and conservation. We then challenge the next generation of engineers to solve our energy crisis by suggesting they learn to harness the incredible power of lightning.

I struggled for several months before arriving at a formula to balance education and entertainment. Little by little the script evolved. History provided the characters and setting, science provided the content, and the puppeteer/actors provided the dramatic context for each vignette.

At left, a few examples:

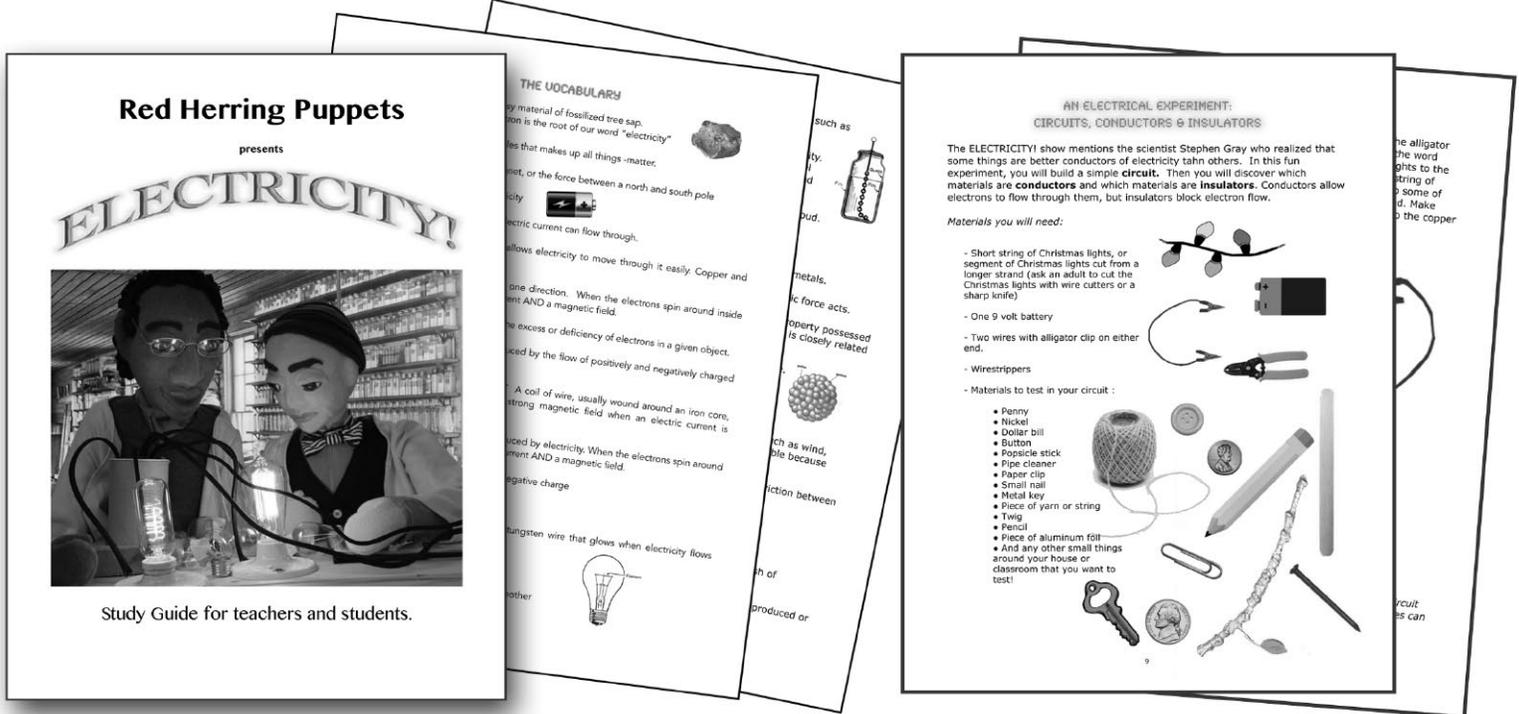
The two puppeteers become the rhyming duo GLOW and FLOW dressed in yellow lab coats with lots of fun sciency stuff in their pockets. Their job is to elucidate scientific discoveries, guide the audience through time and space, and draw connections with familiar experiences like lightning, static electricity, and refrigerator magnets. GLOW and FLOW manipulate large tabletop puppets portraying scientists and historical figures as they invent the magnetic compass, lightning rod, generator, battery, motor and electric light bulb.

To add visual variety, the three-dimensional puppets perform in front of a projection screen. Some of the images are still backdrops providing the setting while others are informational diagrams, animated visual aids or short connecting scenes filmed with two-dimensional jointed paper figures.

SPARK UP THE ENGINE

As rehearsals progressed, I was aware that we needed some dazzling "special effects" to hold audience interest. Although we were finding fun ways to interact, some of the material remained challenging and wordy. I called my friend Brett Pierce, a professional electrical engineer, who devised animatronics for our late friend John Payne's life-size steel dinosaur marionettes and creates the embedded electronics for MagiQuest. Brett read through the script and suggested ways to insert "electrical magic." I came home from our meeting with a much deeper understanding of magnetism, electrons, circuits, current, resistors and motors, along with a fully wired table for our Edison scene. Thank you Brett.

At the 2014 *Southeast Regional Puppet Jamboree*, Red Herring Puppets performed our "work in progress" and led a "Critical Response" feedback session to increase the show's impact. One of the participants was Randy Kilgore of Kilgore Laboratories. An inventor, prop builder, puppeteer and all-around nice guy, Randy shared his observations and volunteered to fabricate additional effects. We now have sparks, a spinning motor, a plasma ball, and a Leyden jar that glows. Thank you Randy.



The study guide is twelve pages and includes background on the program, the puppets and the puppeteers, Curriculum Goals, Vocabulary, Electrons and Electricity (the basics), a historical timeline, practical experiments, a bibliography, and a list of useful websites.

STAYING ON TRACK

Simultaneous to the development of the show, Laura and I created a study guide. This manuscript is an essential tool for school assemblies. It is often required and greatly increases your show's "bookability." The study guide is sent to the school weeks before the performance to prepare the students and teachers for the experience. Typically, it contains a brief summary of the show, a description of the puppetry involved, biographical information about the artists, and curriculum-enhancing content such as vocabulary, topics for further study, a biography, and hands-on enrichment activities. We also included an illustrated description of atoms, electrons, and electricity and a timeline of important developments in the field.

PULLING INTO THE STATION

We have arrived at a unique breed of "edu-tainment", using a creative approach to tackle a difficult subject. Through puppetry, engaging characters, visual aids, and special effects, we integrate art and curriculum. We connect to audiences by relating to their multiple learning styles and abilities. We highlight the process of scientific observation, building upon the inventions and discoveries of the past as a way to solve future energy challenges.

HOME SWEET HOME

"What an amazing performance you gave to Vanstory Elementary yesterday! As an educator and lover of visual and performing arts, I can honestly say I've never seen such a wonderful display of blending art elements while teaching scientific facts. I was truly impressed with your ability to capture the attention of the audience while creating a space conducive to learning science and developing an appreciation for theatrical art. It was incredibly entertaining and delightfully educational! Thank you for sharing your talents with us."

- Avery Cameron, 5th Grade AIG, Vanstory Hills Elementary School

"It was a pleasure seeing you in action this morning! Clearly the students were inspired to build on their existing knowledge and to ask a variety of questions about science and their personal relationship with the world around them."

- Helen Meyer, Program Coordinator United Arts Council of Raleigh & Wake County

HISTORICAL TIMELINE

WHEN	WHO	WHERE	WHAT
????	Sioux Indians	Canada U.S.A	People believed that rain and thunder were caused by Wakinyan Tanka, the Great Thunderbird
	Norse people	Scandinavia Iceland	Thor, God of Thunder
	Aztecs	Mexico Cen. America	Worship of the rain god, Tlaloc, He Who Makes Things Sprout
~2700 BC		Egypt	Referred to electric fish as the "Thunderer of the Nile"
~2500 BC	Greeks	Greece	Greek mythology attributes lightening to the god Zeus, head of the Greek pantheon.
~2000 BC	Magnus	Northern Greece	A shepherd discovered the magnetic attraction of magnetite.
~600 BC	Thales of Miletus	Greece	Thales is considered the father of scientific inquiry because he recorded his observations of static electricity.
300 BC	Huang-ti	China	Huang-ti, a Chinese general supposedly made the first compass using lodestone.
~1200	Chinese	China	Chinese sailors used lodestone as compasses for their ships.
~1350	Arabs	Middle East	Arabic word for lightning (<i>raad</i>) applied to the electric ray.

"The Red Herring Puppet Show was spectacular. So many teachers and students have commented on the educational value and superb presentation. I was mesmerized!"

- Rennie All, Music Teacher, James B. Edwards Elementary School

"I gasped when Edison and Latimer test the carbonized cotton filament and the bulb turns on. I will never forget that moment. I felt like I was there."

- Timmy Abell, performing artist



300 BC: Huang-ti, a Chinese general, supposedly made the first compass using lodestone.



2000 BC: Magnus, a shepherd, discovered the magnetic attraction of magnetite when the metal in his sandals stuck to a rock he was climbing.

THE CONDUCTORS and ENGINEERS

Lisa Aimee Sturz, Red Herring's Artistic Director conceived of the show, wrote the script, and headed up the puppet construction. Scientist and educator, Laura Bochner, served as our primary consultant and helped write several scenes. Brett Pierce, a professional electrical engineer and Professor Judith Beck from UNCA reviewed the script for accuracy and clarity. Randy Kilgore built electrical effects such as sparks, Faraday's motor, and Franklin's Leyden jar. Grayson Morris helped create the puppet bodies and Geneva Bierce-Wilson sewed costumes with Lisa. Carolyn Raleigh created many of the two dimensional figures used in the projected animations. Diane Tower-Jones filmed the paper puppets while Lisa, Carolyn, Theo and Geneva manipulated the figures. The scenes were edited together by Theo Livingston Sturz. Our technical consultant was Mark Blessington. Doug Blessington and Theo Sturz voiced characters for an animated sequence. Puppeteers Lisa Sturz, Kathryn O'Shea, Geneva Bierce-Wilson, and Jon Speer have thus far performed the show.

PUPPETEERS WANTED

Red Herring Puppets, a nationally touring puppet company, is looking for two friends with a van who are ready for an eight-month puppet adventure. (mid-September 2015 through mid-May 2016). We will consider splitting it into two tours before and after Xmas break.

The show, **ELECTRICITY!** combines table top puppets, projected animations, and live performance. The two puppeteers can be any gender combination, but need to share expenses and live together in close quarters for long periods of time.

REQUIRED SKILLS: Comfort as a performer, character voices and accents, good organizational and communication skills, good health, valid driver's license, a van (or other appropriate vehicle) in good condition, artistic ability to maintain the puppets while on the road, navigational skills on the road.

DESIRED SKILLS: Past puppet experience, theatre experience, touring experience, teaching experience, enthusiasm for science.

COMPENSATION: Red Herring Puppets will pay the puppeteers as Independent Contractors. They are responsible for all housing food, and transportation costs while on the road. Red Herring Puppets will contract the bookings, train the puppeteers and provide the show.

IF INTERESTED: Contact Lisa – lisa@redherringpuppets.com for more details.

Check out this link to learn more about the show - www.redherringpuppets.com/electricity.html