LIBERTY SCIENCE CENTER
OUR MISSION, OUR IMPACT
ON PRE K - 12 EDUCATION

2,513
Partner Schools
LIBERTY SCIENCE CENTER AND OUR EDUCATION IMPERATIVE

In many ways, Liberty Science Center is a dual-purpose institution: serving families, on the one hand, and students and teachers, on the other. LSC’s role as a public not-for-profit institution is well known. More than 500,000 children and adults visit us annually for engaging science experiences in our multiple exhibition galleries, theaters, labs, and the Jennifer Chalsty Planetarium—the biggest planetarium in the Western Hemisphere. Liberty Science Center also serves a second audience: 280,000+ preK-12 students and teachers who participate in an extensive suite of immersive STEM-education programs in eight laboratories in LSC’s Center for Learning and Teaching, in other unique learning spaces throughout the Center, and in their own schools and communities throughout New Jersey, the region, and beyond. LSC’s team of 38 STEM educators provides dozens of specially tailored science programs onsite, offsite, and online. During the past three years, 2,513 different schools have participated in LSC programs.

This is the story of LSC’s work on the front lines, getting K-12 students excited about STEM and into the pipeline towards science and tech careers. You’ll learn how LSC assists teachers, providing them with important and unique opportunities for professional development in the teaching of science, and about LSC’s special dedication to the 91,000 students from our most at-risk communities. Working with outside experts and partners, LSC also provides opportunities at the Science Center with free Community Evenings, Special Needs Days, and Rare Disease Day.

I invite you to explore this “other side” of LSC and learn how we teach teachers, inspire students, and work with communities each and every day.

Paul Hoffman
TABLE OF CONTENTS

6  PARTNERS IN SCIENCE
8  TEACHER PROFESSIONAL DEVELOPMENT
12 YOUNG LEARNERS
14 GIRLS IN TECHNOLOGY
16 SCHOOL PARTNERSHIPS
18 LIVE FROM SURGERY
20 COMMUNITY OUTREACH
24 CORPORATE PARTNERS
26 EDUCATION PARTNERS
LSC’s Partners In Science program is unique in that the program actually predates the opening of the Science Center’s physical building. After more than 30 years, the program remains a pillar of our student-oriented programming. Each year high school students apply to LSC to be matched with scientists in labs in their specific area of interest. The application and interview process is tough and rigorous, and ultimately the field is narrowed to approximately 25 students. In addition to the opportunity to work side-by-side with scientists and researchers at companies and universities, students who are selected for the program receive a stipend and have their communication skills polished at LSC. At the end of the summer, students present their research to mentors and family at a special dinner held at LSC. To date, over 1,200 students have participated in this program, and many have gone on to successful STEM careers.
Dr. Amina Moghul
Major, U.S. Army
Director, Mologne Cadet Health Clinic
U.S. Military Academy at West Point

Without Liberty Science Center, her life would have gone another way. That’s what Dr. Amina Moghul says of LSC’s Partners in Science program. “I was a child of immigrants living in Jersey City 20 years ago, and it was rough. Starting with an afterschool program in the 8th grade, LSC helped me focus my interest in science. I completed two summer internships through the Partners in Science program researching the genetics of multiple sclerosis at the University of Medicine and Dentistry of New Jersey in Newark. There I met mentors who helped guide my education and career choices, and I stay in touch with them to this day. The Science Center understood my circumstances and even gave me a small stipend that allowed me to participate. Many of my equally smart peers never had the chances I did through the Science Center, and their talents have been wasted. I wish many more young people had the opportunity I was afforded at LSC.”

Christine Ho
Sophomore, Yale University

Christine Ho has a long history with Liberty Science Center. She visited with her family as a child and later spent two summers working in labs at Rutgers University thanks to her participation in the LSC Partners in Science program. Christine is broadly interested in science though she is gravitating towards a career related to chemistry. “Liberty Science Center made a huge difference in my life,” she says. “Science is a way to explore and understand the world which has always appealed to me, and LSC was an outlet for that when I was a child even though we lived 40 miles away in Bridgewater, NJ. Partners in Science gave me the opportunity to understand what being a scientist really means, and certainly helped me jump into college science classes with confidence.”
Teaching teachers how to teach science—better—is one of the most important things LSC does. In 2014, the New Jersey State Board of Education adopted the Next Generation Science Standards (NGSS) as the K-12 standards basis for New Jersey public schools. Renamed the New Jersey Student Learning Standards - Science (NJSLS-S), the new standards mean significant changes in the way teachers teach science. Included in the new curriculum is the introduction of Engineering, Technology, and Applications of Science and crosscutting concepts. Since the adoption of these standards, NJDOE has relied on LSC as an important partner in working with teachers. LSC has been at the forefront of teacher professional development, teaching educators how to unpack the standards and working with them in their classrooms. Last year, over 2,050 teachers participated in LSC’s Teacher Professional Development programs.
Thanks to a grant from the Prudential Foundation, Liberty Science Center is helping some Newark middle school teachers hone their technology-teaching skills. “Computational thinking and problem solving are critical to student success but many 5th-8th grade teachers need guidance to incorporate computer science and coding into their lesson plans,” says Joshua Koen. “LSC shows our educators what to teach and how to teach it, and provides ongoing support once they begin using their new knowledge in the classroom. Understanding how to thrive in a digital world is a critical skill and we are starting our students with a strong foundation beginning early in their educations,” he explains. This year 24 educators from 12 Newark schools are participating, advancing the district’s goal of giving students expertise in knowing how computers work as well as how to use them.

As a science instructor, Richard Tudda visited Liberty Science Center with his students many times but when he took on the new role of providing science instructional support to teachers in over seventy K-12 schools, he realized that LSC could be an invaluable partner. “To be as effective as possible, teachers need help gaining familiarity with and learning how to implement the new science standards,” he explains. “For three years we have given teachers the opportunity of learning from the Science Center’s experts and they come away feeling excited and empowered about this new way of teaching science. The Center’s staff is outstanding and we look for improved future student performance thanks to LSC’s support.”

**JOSHUA KOEN**
Executive Director for Educational Technology & Computer Science
Newark Board of Education

**DR. RICHARD TUDDA**
Instructional Lead – Science
Division of Learning & Teaching
Staten Island District 31, New York

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**THE CENTER’S STAFF IS OUTSTANDING AND WE LOOK FOR IMPROVED FUTURE STUDENT PERFORMANCE THANKS TO LSC’S SUPPORT.**

DR. RICHARD TUDDA
Four years ago New Providence changed the way K-12 STEM topics are taught, emphasizing real-world questions, intensive investigations, innovation, and creative problem-solving. “Our STEM educators needed assistance as they began building curricula for students arriving in their classrooms with a more sophisticated knowledge base,” says Jon Kearney. “They also needed to learn to co-teach STEM, which was a new process for many of them.” Liberty Science Center’s teacher professional training was an important component of the transition, and Mr. Kearney appreciates the flexibility of LSC’s offerings. “We can go to the Center for group classes or request a customized program in our schools,” he said. “I plan to have every STEM teacher in the district participate in LSC’s teacher training.”

"I PLAN TO HAVE EVERY STEM TEACHER IN THE DISTRICT PARTICIPATE IN LSC’S TEACHER TRAINING."  

JON KEANEY  
Department Head of STEM  
New Providence School District  
New Providence, New Jersey

Manisha Shah is transforming the way science is taught in Jersey City public schools and counts on Liberty Science Center’s Professional Development program to help. “The key to student success is teachers who are agents of change,” she explains. “We need educators who understand how state science standards can be transformed into curricula that give students a strong and consistent foundation. Liberty Science Center’s robust Professional Development program shows teachers how to unpack the NJ science standards and become skilled at helping students thrive.”

"DR. MANISHA SHAH  
Science Supervisor Grades 6-12  
Jersey City Public Schools  
Jersey City, New Jersey"
DR. MANISHA SHAH
Science Supervisor Grades 6-12
Jersey City Public Schools
Jersey City, New Jersey
LSC has a special commitment to creating programming for our earliest learners in Pre-K through Grade 2. LSC’s team of talented educators works with our youngest students and teachers creating curriculum and activities that promote scientific reasoning and thinking. For example, while a child may not be prepared to write observations in a journal, most love to draw pictures of what they are seeing.
Tessa International School (Tessa) provides students ages 2½ - 6 with a strong academic foundation including a custom STEM curriculum developed by Liberty Science Center through collaboration with Tessa. “We offer a science-heavy program,” says Head of School Daniel Buck. “We met with STEM educators from the Science Center before the school year began and the inquiry-based curriculum they developed for us is fantastic. The Center’s young learner experts are really impressive and our students love every lesson.” Daniel and his family are also LSC members. “We signed up on our very first visit because I was blown away by the wide range of experiences,” he explains. “Liberty Science Center is a great community science education asset in every way.”
PROBLEM:
How can a major company positively impact and inspire girls to aspire to a career in technology?

ANSWER:
Ask Liberty Science Center to create an in-school program!

GIRLS IN TECHNOLOGY

In late 2013, Prudential recognized that too few young women and girls were adequately prepared for careers in technology. They asked Liberty Science Center to create a program that could be delivered in Newark’s Public Schools.

LSC’s Girls in Technology program was developed in partnership with Prudential and Newark Public Schools serving students in grades 5 and 6 at Newark’s Luis Muñoz Marin School. In addition, the program challenged participants to consider stereotypes for scientists and professionals in STEM, learn about app development, use robots to learn about programming, and design their own apps.

Give girls a challenge and they will amaze you. Principal Sakina Pitts says her 5th-8th grade students enthusiastically dedicated themselves to learning video game design in a STEM coding experience created by Liberty Science Center and funded by Prudential. Using a visual programming language known as Scratch, developed by the Massachusetts Institute of Technology, Chancellor Avenue School students spent two semesters learning with LSC STEM educators and had a blast. They even “met” a professional coder via Skype and spoke with her about careers in computer science. “The energy of the Science Center staff was very positive and motivational for the students,” Ms. Pitts reports, “and the students were proud of their new abilities. One young lady designed her game to have an infinite number of levels so it would never end. They were recognized throughout the school as true game designers by the end of the program.”

THE ENERGY OF THE SCIENCE CENTER STAFF WAS VERY POSITIVE AND MOTIVATIONAL FOR THE STUDENTS.

SAKINA PITTS
Principal
Chancellor Avenue School
Newark, New Jersey
"THE SCIENCE CENTER IS NOT JUST A PARTNER BUT IS PART OF THE FABRIC OF THE SCHOOL."

DR. LEIGH BYRON
SCHOOL PARTNERSHIPS

New Jersey’s public school system is decentralized, allowing individual districts opportunities to program learning according to their unique student populations. State standards, such as NJSLS Science, apply to all schools and students. LSC works with its partner schools and districts to customize programming and deliver a curriculum that helps to meet the needs of both students and teachers.

Dr. Byron, founder of the two-campus STEMCivics School in Mercer County, says Liberty Science Center has been central to its success since it opened in 2014. “The Science Center is not just a partner but is part of the fabric of the school,” he says. “Working with its STEM educators, we plan curricula that are hands-on, interactive, and project-based. Students complete the projects at school and during monthly trips to the Science Center. No New Jersey School could ever hope to have the kind of instructional resources offered by Liberty Science Center, and by mobilizing those opportunities, we have created an unmatched STEM learning program for our students.”
LIVE FROM SURGERY

Via high definition video conferencing, this unique program allows students to stand next to surgeons in their operating suites and converse with them while they perform complex surgeries, including cardiac bypass, neurosurgeries, kidney transplants and fetal surgeries. In addition students are also introduced to all the member of the surgical team and exposed to potential career opportunities in medicine from surgery to biotechnology. Each year LSC offers over 180 surgeries seen by over 9,000 students.

Some of the best medical centers in the region help us bring the Live From Surgery experience to LSC.

- Morristown Medical Center: Cardiac Classroom
- Overlook Hospital: Neurosurgery
- RWJBarnabas Health: Kidney Transplant
- Hackensack Meridian UMC: Robotic Surgery
- Newark Beth Israel Medical Center: Heart Transplant/VAD
- Advocare the Orthopedic Center in Affiliation with Morristown Medical Center, Overlook Hospital: Pediatric Orthopedic
- The Bristol-Myers Squibb Children’s Hospital at Robert Wood Johnson University Hospital: Neonatal
Bernadette Jacobi is passionate about preparing high schoolers for careers in medicine. “About 90% of the students in my advanced pre-med class go on to healthcare professions,” she explains. Ms. Jacobi takes her students to participate in the Live From Surgery program because it brings classroom lessons to life. “I teach the academic side of medicine but watching live surgery and talking to the OR staff is a powerful experience,” she says.

“We have attended several different Live From Surgery programs but the most important is watching kidney transplants. Students learn about organ donation but also about improving their lifestyle choices and encouraging their families to do the same. It’s a real eye-opener!”

STUART R. GEFFNER, MD, MS-HCM, FACS
Chairman, Surgeon-in-Chief and Director of Renal and Pancreas Transplant Surgery
Saint Barnabas Medical Center
Livingston, New Jersey

When Liberty Science Center approached the Sharing Network about adding organ transplants to its Live From Surgery program, the Network asked Dr. Stuart Geffner to figure out how that could be accomplished. The results have been spectacular. “I have done a lot of significant things in my career,” says Dr. Geffner, “but one of the most meaningful has been the ability to introduce young people to the miracle of transplantation through the Live From Surgery program. Students come to LSC and watch a live feed as a living donor kidney transplant is performed. Over the course of two hours, they observe the laparoscopic removal of the donor kidney and its implantation into the recipient.” They can ask questions of the entire operating room staff and handle some of the devices used during the procedure. Dr. Geffner remarks, “As we talk, students learn about medical careers, organ donation, and healthy lifestyles to help them avoid future medical problems. The middle schoolers are my favorite. They have fewer inhibitions than older students and ask very direct questions. The Science Center’s Live From Surgery program is tremendously impactful and I’m proud to have helped build the program over the past 15 years.”

JOE SWEENEY
Middle School Science Specialist
PS 11, Queens, New York

“Live From Surgery changes entire families,” says Joe Sweeney. Mr Sweeney takes his fifth graders from Queens, NY to Liberty Science Center to watch heart surgery via teleconference. “The medical staff talks about careers in medicine but they also explain risk factors for cardiac disease and those discussions hit home in this multicultural neighborhood. Children leave LSC understanding more about healthy lifestyles and they urge their parents to slim down and adopt a better diet. Some of my students have chosen to go into healthcare thanks to Live From Surgery, which is great, but the program also has a wide influence on my students’ family health.

BERNADETTE JACOBI
High School Science Teacher
Clark, New Jersey

I TEACH THE ACADEMIC SIDE OF MEDICINE BUT WATCHING LIVE SURGERY AND TALKING TO THE OR STAFF IS A POWERFUL EXPERIENCE.

BERNADETTE JACOBI
PROBLEM: How do high school students in New Jersey get their experiment aboard the International Space Station?

ANSWER: Get some good advice from Liberty Science Center!
On February 19, 2017, the SpaceX Falcon 9 rocket headed for the International Space Station (ISS) carrying an experiment designed by four Jersey City students. Liberty Science Center helped the students brainstorm and assess the viability of their ideas, preparing for submission to the SSEP. The experiment examined whether injured muscle can heal faster in microgravity than under strains imposed by Earth’s gravity. After the ISS crew conducted the experiment, the samples were sent back to the students for them to test again and analyze. Though not conclusive, results supported the student’s hypothesis about low gravity tissue repair. The students graduated from McNair High School in 2019 and are attending Rutgers, Brown, Princeton, and Stanford universities.
SPECIAL NEEDS DAY
Twice a year, LSC closes to the public and opens its doors, free of charge, to 3,600 guests with special needs and their families. Working with outside experts, LSC’s extraordinary staff reimagines spaces, labs and programming and adapts them to a special needs audience. Staff members, for instance, have created a sensory map, secured quiet spaces for guests who might become overstimulated, and have turned off the iconic Hoberman Sphere so that visitors on the autism spectrum won’t be startled by the sphere’s unpredictable openings and closings.

RARE DISEASE DAY
As a result of relationships within the special needs community and companies researching treatments for rare diseases, each winter Liberty Science Center hosts Rare Disease Day. Partnering with key pharmaceutical companies like Ovid, LSC creates a fun day for patients and their families dealing with rare diseases such as Fragile X and Angelman’s Syndrome. Now in its fourth year, the program hosts almost 300 guests for lunch, special hands-on programs, and the opportunity to tour LSC free of charge.

COMMUNITY EVENINGS
On 6 evenings each year, from 5:00 - 9:00 pm, Liberty Science Center opens its doors, free of charge, to families from at-risk communities throughout New Jersey. On those evenings all activities, movies, labs, and shows are available free of charge to our guests. Often special programming such as basic health screenings is available from community partners.

Generally we will welcome between 1,500 and 3,500 guests on these evenings. Our communities include, but are not limited to:

Asbury Park, Monmouth County
Bridgeton, Cumberland County
Burlington City, Burlington County
Camden, Camden County
East Orange, Essex County
Elizabeth, Union County
Garfield, Bergen County
Gloucester City, Camden County
Harrison, Hudson County
Hoboken, Hudson County
Irvington, Essex County
Jersey City, Hudson County
Kearnsburg, Monmouth County
Long Branch, Monmouth County
Millville, Cumberland County
Neptune Township, Monmouth County
New Brunswick, Middlesex County
Newark, Essex County
Orange, Essex County
Passaic City, Passaic County
Paterson, Passaic County
Pemberton Township, Burlington County
Perth Amboy, Middlesex County
Phillipsburg, Warren County
Plainfield, Union County
Pleasantville, Atlantic County
Salem City, Salem County
Trenton, Mercer County
Union City, Hudson County
Vineland, Cumberland County
West New York, Hudson County
PROBLEM:
How does a storied, family-focused corporation show valuable, meaningful support for its home community?

ANSWER:
By teaming with trusted partners at Liberty Science Center to deliver state-of-the-art science education programs to students and teachers in the local public school system.

CORPORATE PARTNERS
LSC is supported by a number of important corporate partners and among our largest supporters is Johnson and Johnson. While LSC has enjoyed a robust relationship with J&J over the years, in 2008 J&J took it to the next level, challenging LSC to deliver programs to students in New Brunswick Public Schools almost every day of the week. Each year the LSC team sits down with colleagues at both J&J and administrators from New Brunswick Public Schools to set the programs LSC will deliver to students the following year. Over the past three years LSC has worked with nearly 20,000 New Brunswick students. We have also delivered professional development programs to over 175 teachers.

Dr. Jessica Monaghan oversees science instruction for 10,000 students in grades K-12 and Liberty Science Center helps her reach one of her primary goals - to get kids to ask questions about what they see around them. “Curiosity is a powerful force,” she explains. “I want students to come into the classroom asking how and why things work, then go home and have discussions with their parents about what they learned.” With support from a Johnson & Johnson Foundation Global Community Impact grant, LSC presented a number of programs in New Brunswick including two family STEAM nights featuring a variety of fun, hands-on science activities. “We had great feedback from teachers and students,” she said. “Time spent with LSC’s educators left students excited, motivated, and wanting to learn more.”

JESSICA MONAGHAN, ED.D.
Supervisor of Science K-12
New Brunswick Public Schools
Johnson & Johnson Foundation Global Community Impact Grant

TIME SPENT WITH LSC’S EDUCATORS LEFT STUDENTS EXCITED, MOTIVATED, AND WANTING TO LEARN MORE.

JESSICA MONAGHAN
LIBERTY SCIENCE CENTER’S UNIQUE ASSETS

The largest planetarium in the Western Hemisphere—The Jennifer Chalsty Planetarium

110 species of animals, each with a unique science story to tell

60,000+ honey bees, pollinating plants in Liberty State Park and fascinating LSC guests

90-pound drum fish and other local marine life in Our Hudson Home aquariums

35 tons of sand covering fossilized bones in Jack Horner’s Dino Dig

A 100 mph hurricane wind and rain simulator and earthquake shake tables to test the strength of skyscrapers

A suspended, cantilevered playground enclosed in 19 miles of protective mesh (Safe physical challenges throughout LSC build children’s confidence and motor skills.)

Indoor lightning bolts, courtesy of twin one-million-volt Tesla coils

Live From Surgery program connecting life-science students to surgical teams in action

38 highly trained STEM educators leading our student programs and providing teacher professional development

*Microbes Rule!* Art made from bacteria that reveals the good side of microbes

Three traveling science vans to bring mind-blowing STEM demonstrations to schools

*Touch Tunnel*, a dark maze where eyesight doesn’t help

Science on a Sphere showing real-time climate data from the National Oceanic and Atmospheric Association

The *MakerLab* where students each have their own 3D printer
OUR COMMUNITY OF 2,513 PRE K - 12 EDUCATION PARTNERS

We are proud to serve so many schools across the region.
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