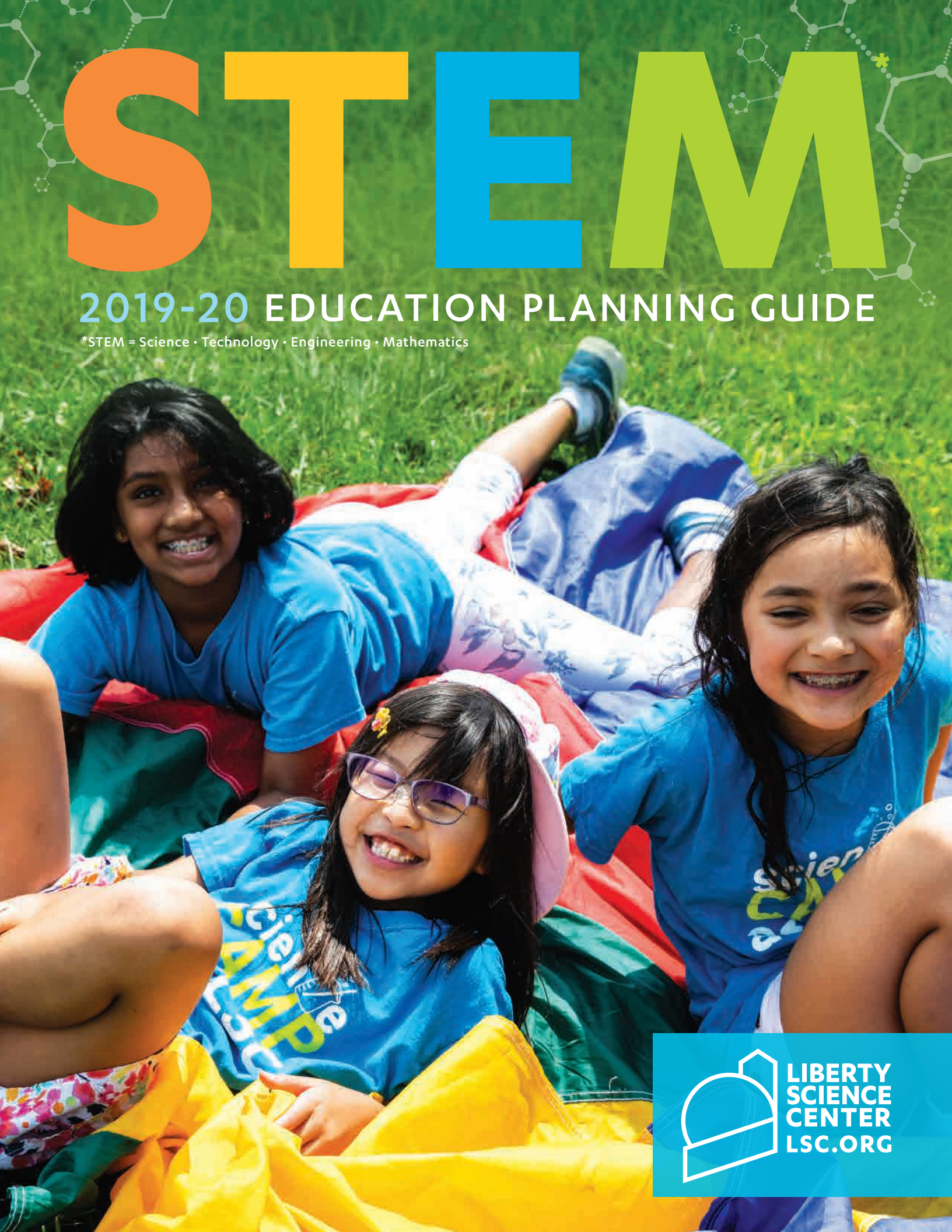
STEM*

2019-20 EDUCATION PLANNING GUIDE

*STEM = Science • Technology • Engineering • Mathematics



LIBERTY SCIENCE CENTER
LSC.ORG

NUMBERS TELL OUR STORY 2018-2019 METRICS

750,000+
total annual visitors

280,000+
student visitors

2,513
partner schools

1,200+
STUDENTS PARTICIPATED IN PARTNERS IN SCIENCE

9,700
STUDENTS EXPERIENCED *LIVE FROM SURGERY* PROCEDURES

3,300+
LIVE SCIENCE PRESENTATIONS

91,000
"AT RISK" STUDENTS

2,050+
TEACHERS IN PROFESSIONAL DEVELOPMENT

WELCOME TO THE LIBERTY SCIENCE CENTER STEM EDUCATION PLANNING GUIDE

In the 21st Century, scientific and technological innovation are vitally important to our quality of life and the strength of our economy. In order to maintain and improve both, we must do a better job of inspiring and preparing the next generation of scientists and engineers. In New Jersey, there are 1.4 open STEM jobs for every unemployed person. Across the country, there are over three million more STEM jobs than there are trained professionals to fill them. Meeting this demand requires intentional and concerted efforts to provide students with rich, rigorous, and relevant experiences that will propel more of them into careers in STEM.

Children are born with an innate sense of awe and wonder about the world around them. As they progress through grades K-12, it is our charge to harness, and continue to ignite, the spark of curiosity around scientific phenomena. In doing so, we can foster an interest in science that persists into adulthood, inspires citizenship that protects our most precious resources, and readies them for a wealth of STEM opportunities.

Liberty Science Center has a special commitment to creating programming for our young learners in Pre-K through grade 2. As a leader in STEM education, we are able to leverage the enthusiasm and expertise of our talented educators to create curriculum and activities that promote asking questions, collaborative learning, and scientific reasoning and thinking. From permanent exhibits, lab workshops, and live science shows, to our Joseph D. Williams 3D Science Theater and Jennifer Chalsty Planetarium—the biggest planetarium in the Western Hemisphere— we are able to captivate and connect to these early explorers in meaningful ways.

As school districts in New Jersey continue to make the instructional and programmatic shifts necessary to implement the New Jersey Student Learning Standards for Science (NJSLS-S), Liberty Science Center is uniquely able to excite, encourage, and equip both students and teachers. Our STEM programs are designed to provide students with a diverse range of opportunities to engage in phenomenon-centered experiences that expand their thinking, extend their learning, and help them progress towards mastery of NJSLS-S Performance Expectations. In the past three years, we've partnered with 2,513 schools.

Our STEM Education Planning Guide includes a program overview, offerings by grade-band, and professional development catalog. Each program is explicitly connected to the NJSLS-S to help you identify those that best support your goals. If you have an interest outside of our listed offerings, please let us know. Our STEM education team is primed to develop programming aligned to your curriculum, and to design professional development tailored to your needs. We look forward to partnering with you to inspire the next generation of scientists and engineers and excite learners of all ages about the power, promise, and pure fun of science and technology!

Ivory Williams
Vice President
STEM Teaching, Learning, and Innovation

Liberty Science Center acknowledges the generous support of Josh Weston and Jennifer Chalsty.
LSC is also grateful to the following donors for their support.

LEAD SUPPORTERS:

BANK OF AMERICA
ExxonMobil
Horizon Foundation for New Jersey
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ADDITIONAL SUPPORTERS:

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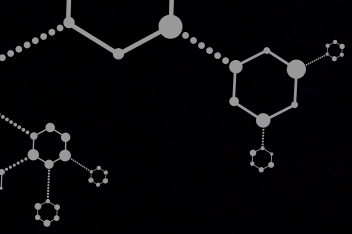

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OVERVIEW

All of LSC's education programs are aligned with NJSLS (Science). Look for specific standards alignment below each program offering in this guide.

PROGRAMS BY GRADE

GRADES PRE-K - 2

GRADES 3 - 5

GRADES 6 - 8

GRADES 9 - 12

TEACHERS

JENNIFER CHALSTY PLANETARIUM

The Jennifer Chalsty Planetarium is the biggest planetarium in the Western Hemisphere and fifth largest in the world, and is uniquely designed to display Earth and Space Systems phenomena in a way that's just not possible in the classroom. The 27-meter (89-foot) dome, coupled with an all-dome video and astronomical object database, provides an immersive environment in which to explore the Earth and Space Systems Performance Expectations of the NJSLS (Science). View astronomical objects and celestial phenomena from the surface of Earth and then travel into space to truly understand these difficult concepts by flying up to, around, and through the objects. We can also speed up time in the planetarium, allowing you to make an entire year of space systems observations during one program—seasons, moon phases, seasonal constellations, and more.

Check your grade-level band section for planetarium programs that are aligned with your grade-specific NJSLS (Science) requirements.

WESTON FAMILY LAB FOR EARTH AND SPACE EXPLORATION

The visually stunning Weston Family Lab allows students to explore the Earth Systems Performance Expectations using authentic data. Experience the only publicly available NOAA *Science on a Sphere (SOS)* in New Jersey, which allows detailed examination of the Earth, sun, and planets. The six-foot spherical visualization globe allows students to explore earthquakes, hurricane tracks, sea surface temperatures, plate tectonics, weather patterns, and more. Under the guidance of an LSC Educator, see current conditions as well as historic global events in these 30-minute live programs.

Check your grade-level band section for SOS programs that are aligned with your grade-specific NJSLS (Science) requirements.

LIVE FROM SURGERY

Live From Surgery brings the world of health care to the next generation of surgeons and biotechnology experts. Experience the dynamics of surgery, problem solving, and teamwork in a real operating room. Connect to four hospitals in New Jersey through videoconferencing to interact with the medical team during a surgical procedure while handling the same tools that the medical team is using. Groups that choose robotic surgery can even use simulation software to manipulate a robot hand—and we have an actual surgical robot on site. We partner with the most prestigious hospitals across the region for this unforgettable experience.

CHOOSE FROM:

- **Live From Kidney Transplant**
  with RWJBarnabas Health | 2.5 hours
- **Live From Cardiac Surgery**
  with Morristown Medical Center | 2.5 hours
- **Live From Neurosurgery**
  with Overlook Hospital | 3 hours
- **Live From Robotic Surgery**
  with Hackensack Meridian UMC | 2.5 hours

Can't bring your group to LSC? Most programs can be transmitted into your classroom using distance learning technology. See page 15 for technology requirements. Must be booked in advance. Call 201.253.1310.

Our *Live From Surgery* program also features three *Meet the Surgeon* sessions. Speak to the professionals face to face as you explore recent cases, understand each medical problem, examine the course of action, and review the outcomes. These sessions create an intimate environment in which surgeons can focus their attention on the students while narrating and showing a video of the surgical procedures.

CHOOSE FROM:

- **Meet the Surgeon: Heart Transplant**
  with Newark Beth Israel Medical Center | 2.5 hours
- **Meet the Surgeon: Pediatric Orthopedics**
  with Advocare the Orthopedic Center in Affiliation with Morristown Medical Center, Overlook Hospital | 2.5 hours
- **Meet the Surgeon: Neonatal Surgery**
  with the Bristol-Myers Squibb Children's Hospital at Robert Wood Johnson University Hospital | 2.5 hours

NJSLS (Science): Heredity: Inheritance and Variation of Traits: 3-LS3-2, Structure, Function and Information Processing: MS-LS1-3, MS-LS1-5 Structure and Function: HS-LS3-1
NYCCLS: 1, 2, 3a, 3b, 5, 6 & 7
National Science Education Standards: M.C.1, M.C.1.f. & M.F.1.a.
National Health Education Standards: 1.12.4 & 7.12.1

EARLY CHILDHOOD WORKSHOPS

Put discovery in the hands of your young scientists with activities that promote scientific thinking and reasoning. These programs are for students in Pre-K through grade 2, at Liberty Science Center or at your school, for 45 minutes.

ASSEMBLY PROGRAMS

Kick start the school year with a science spectacular! Let us present our highly entertaining and science-rich assemblies at your school. These programs are appropriate for grades K - 8 for a maximum group of 300 students per show. Each assembly is up to 60 minutes of science fun.

Add some hands-on science flair to your school science fair or special event! Our staff can lead a hands-on activity station that complements your theme. All programs must be booked in advance. They support curriculum standards and multiple learning styles, and can be configured to fit your needs. To book any program, please call our reservation line at 201.253.1310.

LABORATORY WORKSHOPS

45-MINUTE WORKSHOPS

Our 45-minute Laboratory Workshops, offered at Liberty Science Center or at your school, will reinforce learning through hands-on exploration. These labs often spark a lifelong interest in STEM fields. Programs are available for grades 3 - 12, and can accommodate up to 30 students.

90-MINUTE WORKSHOPS

Explore a subject more fully with an in-depth, 90-minute Laboratory Workshop. General admission to the Science Center is included, and your group is welcome to explore LSC before or after your session. Programs are available for grades 3 through 12.

ELECTRONIC FIELD TRIPS

Engaging students in high-quality science experiences has never been so easy. Connect your classroom to exciting, interactive videoconferencing programs. These programs are typically 45 minutes long and taught by STEM instructors using platforms such as FieldTripZoom or Google Hangouts.
No permission slips required!

VIDEOCONFERENCE TECHNICAL REQUIREMENTS

IP or SIP Connection:

- Hardware: Videoconference Codec (Polycom, Tanberg/Cisco, or Lifesize)
- Camera, microphone, speakers, display device
- IP address and meeting ID will be sent to you via email once the test connection date has been confirmed.

Internet Connection:

- Wired internet connection recommended; webcam, microphone, speakers, display device
- Internet web link will be sent to you via email once test connection date has been confirmed.


eck
FIRST Lego League
eck

GIRLS IN STEM

A huge opportunity is on the horizon for young women entering STEM professions. According to the Bureau of Labor Statistics, women compose 47% of the US workforce. However, overall, women hold just 25% of all STEM jobs. Also, the gender wage gap is smaller in STEM jobs than in non-STEM jobs. Women in STEM earn 33% more than comparable women in non-STEM jobs; this is considerably higher than the STEM premium for men. The average salary for a career in a STEM field is $85,000.

Liberty Science Center is proud to pave the way for more girls to prepare for and enter vital, lucrative STEM fields. Our education staff develops and delivers unique STEM programming to girls in both coed and single-gender settings. Our approach to these programs allows girls of all ages to explore STEM-based phenomena as they discover their passion and, perhaps, their future career. Contact us for further information.

TECH SKILLS ARE IN DEMAND

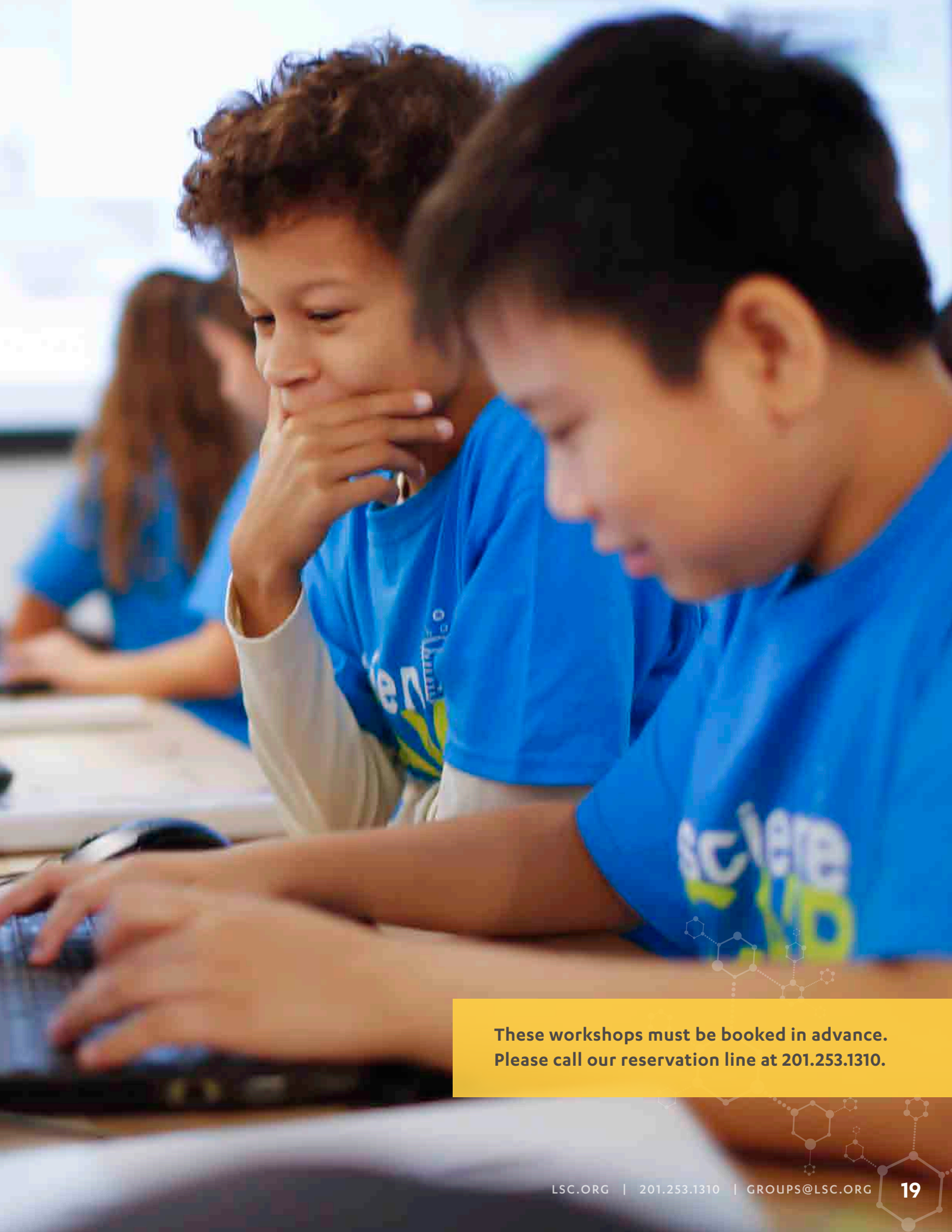
According to the Bureau of Labor and Statistics, computer-based occupations are projected to increase by 12.5% from 2014 to 2024, an uptick expected to result in nearly half a million new jobs—far more than any other STEM category. The occupation projected to add the second-largest number of new jobs from 2014 to 2024 is engineering, with 65,000 new jobs. Liberty Science Center's programs introduce exciting technology skills that help you meet curriculum goals and reinforce new concepts with invaluable, hands-on experiences. Come for a few hours, a full day, or a series of workshops over the course of several weeks. Programs are aligned to the NJSLS (Science), ISTE standards, and NJSLS (Math).

MAKERLAB WORKSHOPS

In these lab-based programs at Liberty Science Center, we celebrate and encourage the creative, curious, and inventive spirit that all students have. The maker culture is at the heart of this lab with a 1:1 student-to-3D-printer ratio, so every student works with a designated printer in our programs.

TECH & DESIGN STUDIO WORKSHOPS

Learn the latest technology skills in 45-minute workshops for grades 2 - 8 and 90-minute workshops for middle school and high school. These programs apply computational thinking and design thinking to identify solutions or create dynamic projects.



These workshops must be booked in advance. Please call our reservation line at 201.253.1310.

TRAVELING AFTER-SCHOOL PROGRAMS

LSC brings science learning to you! Take part in hands-on, science-based programs one hour per week at your location. A workshop series provides project-based learning supported by development of critical thinking, collaboration, innovation, and problem solving over an extended period of time. We offer several program formats to meet your needs. Choose one or multiple sessions and select a range of topics, or build on the same topic over several weeks.

Grades: 1 - 12

Length: Single week or multi-week series

SOME POPULAR TOPICS INCLUDE:

FORENSIC SCIENCE

Crack a case using the same techniques real forensic scientists use, such as checking for fingerprints, comparing fibers, DNA analysis, the science of ballistics, and more.

GROWING INTO SCIENCE

Learn about a multitude of STEM career opportunities and see how science fits into your future! We provide opportunities for exciting science learning using experiential, hands-on models that cannot always be replicated during the traditional school day.

Contact an LSC representative for assistance planning a unique and unforgettable after-school science program for your school: 201.253.1310.

COMMUNITY OUTREACH EVENTS

Liberty Science Center is proud to support underserved communities of learners throughout the surrounding region. Here are some highlights from our community outreach efforts.

COMMUNITY EVENINGS

On six 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 from the 31 cities that formerly held Abbott school districts. Often, special programming such as basic health screenings is available from community partners.

This year's Community Evenings will be held:

OCTOBER 30
NOVEMBER 20
JANUARY 29
FEBRUARY 26
MARCH 25
APRIL 29
JUNE 3

SPECIAL NEEDS DAYS: DEC. 3, 2019, MARCH 31, 2020

We invite special needs learners and groups to enjoy science and technology programming designed just for them. These special days feature activities appropriate for all kinds of learners, a sensory map of LSC, and a social narrative that guests can download in advance to prepare special needs learners for the visit.

RARE DISEASE DAY

This free event brings the power, promise, and pure fun of science and technology to those impacted by a rare disease, their caregivers, and their close family members. LSC educators and staff pull out all the stops to make the day memorable for these very special families. The event not only brings the rare disease community together, but also supports advocacy for rare disease research.

SPECIAL DAYS TO VISIT

Trying to decide which weekday is best for a visit? The events here may inform your decision. Also check **lsc.org** closer to the time of your trip for updates!

FALL

SEPT. 21: *Dinosaur Train: The Traveling Exhibit* Opens
Young learners will celebrate dinosaurs and trains in this new featured exhibition.

SEPT. 28 - NOV. 3: Fall Fest
See if you can find your way out of a 4,000-sq-ft the Spider Maze. Explore a giant straw pyramid and a hay maze. Inside, there's a pumpkin patch, a pumpkin lab, and more fall fun.

OCT. 5: *Angry Birds Universe* Opens
This premium exhibition explores the science, technology, engineering, art, and math concepts behind the popular, addictive game.

OCT. 19 - 27: Fall Fright Fest
Find special Halloween-themed labs and experiences throughout the building.

OCT. 23: Young Learner Day
Reserve if your group is in Pre-K through Grade 2. We will feature labs, experiences, and shows appropriate for early learners on every floor.

NOV. 7 - 8: Science Camp At LSC Mini-Camp
LSC is open extra hours during the NJEA conference, and offering a two-day session of Science Camp. Find out more at **lsc.org/camp**.

WINTER

DEC. 3: Special Needs Day

Reserve space for your special needs learner or group. We will feature activities appropriate for all kinds of learners, a sensory map of LSC, and a social narrative you can download in advance to prepare your learners for the visit.

FEB. 1, 2020: *Wild Kratts: Creature Power* Opens

This exhibition features animal experts Chris and Martin Kratt and a cast of heroes and villains as they explore the secret lives of extraordinary creatures. Using Kratt technology and the powers of science and collaboration, children will help the team solve problems and protect animals.

FEB. 14 - 23: Engineering Everywhere

Each day we focus on a different aspect of engineering: civil engineering, biomedical engineering, robotics, defense tech, and more. You can build a bridge, experience augmented reality, take over the controls of a cool robot, or learn how our animals use engineering skills.

SPRING

EARLY MARCH: Day Of Drones

Fly a drone, watch heart-pounding races, learn new skills, and meet some incredible drone pilots. In partnership with the New York Drone Film Festival, we also feature award-winning films by the top drone film makers. Check **lsc.org** in early 2020 for dates and details!

MARCH 30: Young Learner Day

Reserve if your group is in Pre-K through Grade 2. We will feature labs, experiences, and shows appropriate for early learners on every floor.

MARCH 31: Special Needs Day

Reserve space for your special needs learner or group. We will feature activities appropriate for all kinds of learners, a sensory map of LSC, and a social narrative you can download in advance to prepare your learners for the visit.

APRIL 6 - 19: All About Animals

This conservation celebration features the best of our live animal programs, up-close encounters with visiting creatures, and in-depth information on the importance of protecting endangered species. It's gonna be wild!

APRIL: Rare Disease Day

This free event brings the power, promise, and pure fun of science and technology to those impacted by a rare disease, their caregivers, and their close family members. The event not only brings the rare disease community together, but also supports advocacy for rare disease research. To inquire about attending, please e-mail **mspann@lsc.org**.

FIELD TRIPS TO LSC

When your school or group visits LSC, you can witness actual surgery, explore science concepts in our lab workshops, take in a live Center Stage Science show, master new skills in our Tech & Design Studio or MakerLab, and enjoy all of the exhibits and shows that make the Science Center a prime destination for learners of all ages and abilities. We would love to help you plan your next LSC adventure.

FIELD TRIP ENHANCEMENTS

Weston Family Lab for Earth and Space Exploration

This stunning new laboratory classroom on the second floor features *Science on a Sphere*, a six-foot suspended globe that uses HD images uploaded directly from NOAA and NASA. The STEM team at LSC leads programs exploring weather, climate change, the continents, plate tectonics, and more—all aligned to the K-12 NJSLS (Science).

Jennifer Chalsty Planetarium and LSC Giant Dome Theater

Students can explore the night sky, travel deep into the cosmos, or investigate Earth's natural and biological wonders under the colossal, immersive dome screen, the biggest in the Western Hemisphere.

Live Science Presentations

These interactive 20-to-25-minute presentations take place throughout the building, led by a STEM Educator with plenty of audience volunteers. Offerings vary each day, but may include explorations of rocketry and flight, health and fitness, the states of matter, electricity, air power, and more.

Laboratory Workshops

Explore science and tech topics in our fully equipped, authentic laboratories. Workshops are tailored for learners from pre-k through high school. Spend an hour, a morning, or a full day learning in the lab.

Live From Surgery

Watch a real surgical operation and interact with the medical team through videoconference technology. Choose from an array of procedures and we will connect you with our expert partners across the region.

MakerLab and Tech & Design Studio

Learn coding, robotics, or game design in our Tech & Design Studio. Or explore our MakerLab with a dedicated laptop and 3D printer for each student.

Center Stage Science Shows

Our live theater shows bring science concepts to life and include audience participation. Each show aligns with core concepts from required NJSLS (Science).

HANDS-ON EXHIBITIONS

Your students will have a blast on our four exhibition floors, with hands-on experiences for all ages and stages of learning. Our galleries bring a wide range of STEM topics to life, from the environment and Earth science to health and green energy choices. Access to our general admission exhibitions is included with our programs. Education staff and volunteers are happy to answer questions, assist with interactive features, and tell you more about what you're seeing.

BEES TO BOTS

Explore the photography exhibit that lets you get up close to bees and learn how they are going high-tech with GPS tracking. Then learn how bees inform the design of nano flying robots. Watch a live colony of honey bees from just inches away as they go about their daily work. See bees collecting nectar and making honey, and get close enough to hear them buzz. Can you spot the queen?

COMMUNICATION

Discover how humans have exchanged ideas, from neolithic hand prints to sign language. See your electronic voice waves, and leave your mark on the digital Graffiti Wall.

DREAM MACHINE

Explore different emotions in this interactive, sensory adventure! Use bicycle pumps to produce combinations of colors, sounds, and scents—some pleasant, some unpleasant.

EAT AND BE EATEN

Learn how creatures evolved to catch prey and avoid being captured in our live animal exhibition. Study beautiful examples of camouflage. See mammals, insects, reptiles, amphibians, birds, and fish—and marvel at nature's complexity. Don't miss the incredibly adorable family of critically endangered cotton-top tamarins, the colony of industrious leaf-cutter ants, or the growing community of naked mole rats!

ENERGY QUEST

Drill for oil, locate uranium, discover the power in ocean waves and dams, and explore renewable energy: solar, geothermal, and wind.

HOBERMAN SPHERE: ART & ENGINEERING

Learn the history and engineering ingenuity behind the fascinating expanding and contracting sphere.

I EXPLORE

Enjoy interactive exhibits, and themed play experiences exclusively for learners ages 2–5.

INFINITY CLIMBER

Explore this two-story climbing structure suspended 35 feet above the Center's atrium floor. Can you make it to the top?

MICROBES RULE!

Learn about the amazing world of microbes, the tiny living organisms all around us. See the positive, wondrous, beautiful things microbes can do and make your own microbial artwork.

NANO MINI-EXHIBITION

Learn about nanoscience—the science of the super small — in this collection of hands-on exhibits.

OUR HUDSON HOME

Get acquainted with the creatures that live in the Hudson River at our Touch Tank and in our enormous aquariums, including 80-pound drum fish, terrapins, sea stars, and sea urchins. Then unload a virtual cargo ship, dredge a river channel, and try a real hands-on lab experiment.

PIXEL ART

Rotate 952 pixel dials to make an illuminated work of art on the wall.

PIXELPALOOZA FROM BELL LABS

Play an active, multi-user game and learn about computer vision.

SKYSCRAPER!

Enter a cityscape of towers and discover what it takes to design and build the world's tallest skyscrapers. Walk on an 18-foot-high I-beam just like a construction worker, see what it's like to test a building in a wind tunnel, operate an electromagnetic crane, learn about careers in construction and architecture, and see artifacts from the World Trade Center.

SURE HOUSE

Take a tour of this storm-resistant, energy-efficient beach house designed by Stevens Institute of Technology students and winner of the 2015 Solar Decathlon sponsored by the US Department of Energy.

THE TOUCH TUNNEL

Take an 80-foot crawl through a pitch-black tunnel using only your sense of touch. It's one of our most popular experiences, so visit early or late in the day to avoid a wait.

WONDER WHY

Experiment with air in motion, make a six-foot-wide soap bubble, scramble up our fossil-studded rock climbing wall, and more.

FEATURED EXHIBITIONS

We host several exciting exhibitions each year that relate to topics in science and technology, and incorporate pop culture and entertainment. This school year, exhibitions will include:

DINOSAUR TRAIN: THE TRAVELING EXHIBIT SEPTEMBER 21, 2019 - JANUARY 20, 2020

ANGRY BIRDS UNIVERSE OCTOBER 5, 2019 - APRIL 19, 2020

WILD KRATTS: CREATURE POWER! FEBRUARY 1 - MAY 31, 2020

THE SURE HOUSE

Explore the SURE House on our front lawn! Designed by Stevens Institute of Technology students, the house won the prestigious Solar Decathlon, run by the US Department of Energy.

The SURE team merged the efficient indoor-outdoor rooms and open floor plan of a traditional beach cottage with state-of-the-art building science, the latest renewable energy technologies, and fiber-composite materials repurposed from the boat-building industry. The result is a building armored against extreme weather that uses 90% less energy than its conventional cousins, powers itself through clean solar energy, and becomes a hub for emergency power to the neighborhood in the aftermath of a storm.

Your group can explore the SURE House as part of a workshop on clean energy, electronics, or meteorology. Topics may include:

- **Exploring Renewable Energy**
- **Introduction to Electronics**
- **Energy Audits**
- **Insulation Lab**
- **Green Roof Construction**
- **Beach Erosion**
- **Tropical Storm Systems**

TEACHER PROFESSIONAL DEVELOPMENT

Teachers face new challenges as they continue to adopt and implement the NJSLS. Liberty Science Center can partner with your school or district to offer engaging and effective professional development programs tailored to implementing the NJSLS.

Liberty Science Center is a registered professional development provider with the NJ Department of Education; provider #1033.

EDUCATOR MORNINGS

Want to see how LSC's fun, exciting experiences can help you achieve your education goals? Join us for one (or all!) of our themed Educator Mornings. Preview some of our STEM programs, including hands-on experiences and mini-lab sessions, all at your own pace. Bring one complimentary guest* and enjoy a film, continental breakfast, a 20% discount at our gift shop, and free raffle drawings! Teachers can earn three professional development hours.

*One free guest per teacher participant. Includes general admission and a film.

EDUCATOR MORNINGS

10:00 AM - 1:00 PM

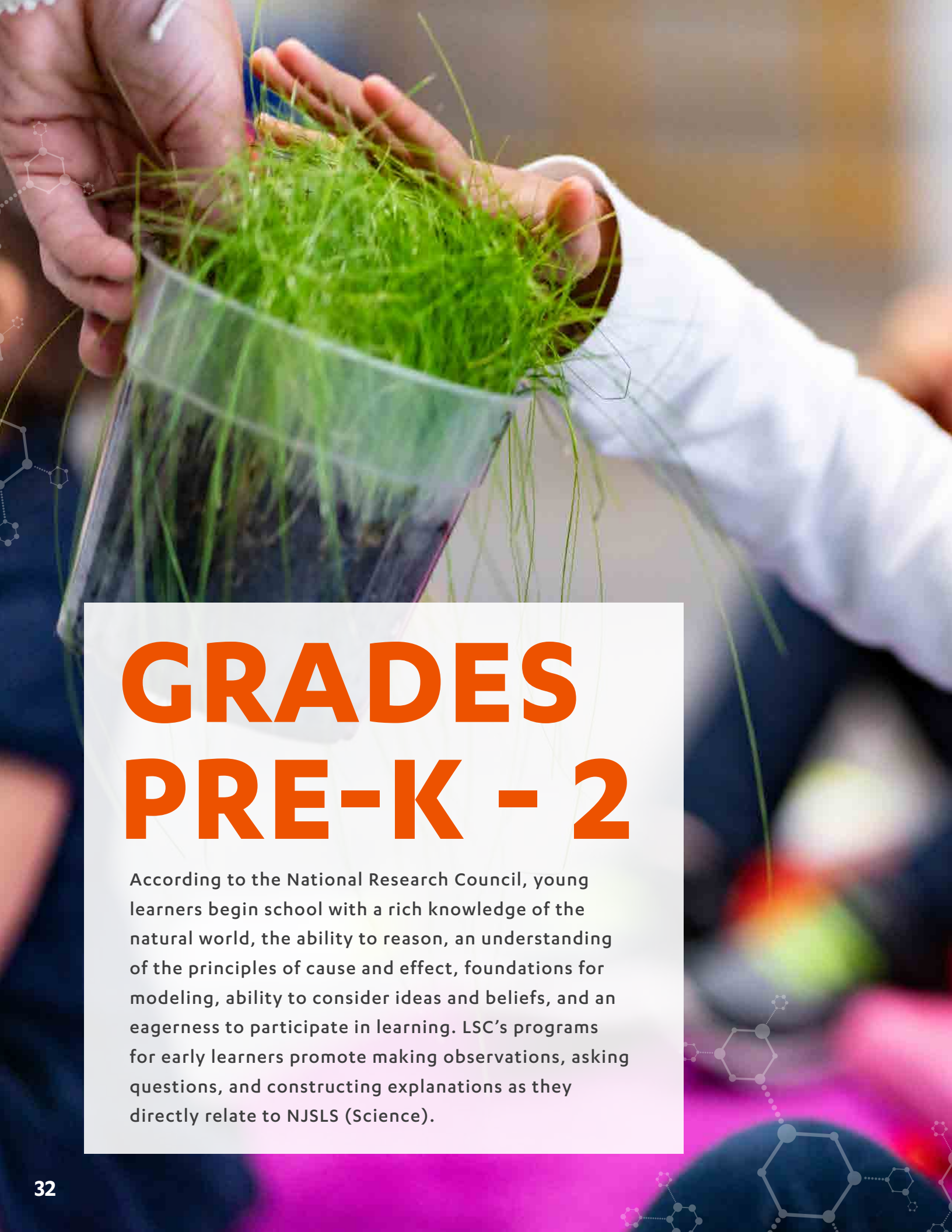
September 14, 2019

October 26, 2019

January 11, 2020

February 22, 2020

Each event is free, but space is limited. Register at LSC.org under the "Education" section or email Lauren Rose: Lrose@lsc.org.



GRADES PRE-K - 2

According to the National Research Council, young learners begin school with a rich knowledge of the natural world, the ability to reason, an understanding of the principles of cause and effect, foundations for modeling, ability to consider ideas and beliefs, and an eagerness to participate in learning. LSC's programs for early learners promote making observations, asking questions, and constructing explanations as they directly relate to NJSLS (Science).

JENNIFER CHALSTY PLANETARIUM

Wonders of the Night Sky (Grades K - 12)

Using the unique immersive environment of the planetarium, students will explore Earth and space science concepts using the current night sky above New Jersey. Topics covered are correlated with objects visible in the night sky on your visit date and will include: seasonal constellations and planets, exciting deep-sky objects in the current sky, and breaking astronomical news.

NJSLS (Science): Topics discussed during the program will be correlated to the corresponding Earth and Space Science Performance Expectations for the grade level of the students attending the program.

Patterns of the Sky (Grade 1)

Explore observations of the sun, moon, and stars to discover patterns that can be predicted. These patterns include sunrise and sunset locations, moon phases, and how constellation visibility varies with Earth's position from season to season. (30 min.)

NJSLS (Science): 1-ESS-1-1

One World, One Sky (Grades Pre-K - 2)

Join Big Bird and Elmo as they explore shapes in the sky and even go on a trip to the moon! (30 min.)

NJSLS (Science): 1-ESS1-1

WESTON FAMILY LAB FOR EARTH AND SPACE EXPLORATION

Rain, Rain, Go Away! (Grade K)

The six-foot *Science on a Sphere* will be used to explore causes for our weather and to see how Earth's weather changes from place to place and with the seasons.

NJSLS (Science): K-ESS2-1

Fast Change, Slow Change (Grade 2)

The *Science on a Sphere* will be used to explore how Earth has changed over time as continents shift, separate, and collide. See what the planet looked like in the days of the dinosaurs. We'll also use the big globe to examine ways in which the forces of wind, water, and ice have changed our planet gradually or suddenly.

NJSLS (Science): 2-ESS1-1

ASSEMBLY PROGRAMS

Fundamental Physics

Alex would much rather play with toys than learn about boring physics. But soon Alex will learn that physics is all around: at home, the park, and even on a simple walk! The pushes and pulls of favorite games will entertain and educate both Alex and your students, and help them understand that physics is fun!

NJSLS (Science): K-PS2-1, K-PS2-2

45-MINUTE WORKSHOPS

Waterbenders

At LSC

Stop water from changing the shape of land and protect a simulated town. Using a variety of materials, students will have to engineer a structure to prevent the effects of erosion in this engineering-meets-earth-science, hands-on workshop.

NJSLS (Science): 2-ESS2-1

The Skeleton Inside You

At LSC | At Your School

Why do we have bones? What are they made of? How is their structure related to their function? What happens when they break? Discover these answers and many more as we learn about bones in the story *The Skeleton Inside You* by Philip Balestrino. After reading our story, craft your own 'broken bone' and mend it with a cast.

NJSLS (Science): K-2-ETS1-2

Nature's Helpers

At LSC | At Your School

Discover how we depend on plants, insects, and other animals, and how they are essential to the environment we live in. This workshop includes live animal encounters and hands-on activities on topics such as pollination and soil ecology.

NJSLS (Science): 2-LS2-2

Rocky Looks at Living Things

At LSC | At Your School

Rocky the rock is wondering whether he is alive. Investigate what living things need, how they grow and change, and the ways that they survive in their habitats. Parts of life cycles, camouflage, living and nonliving specimens will all be observed in order to gather evidence for Rocky.

NJSLS (Science): 2-LS4-1

Me... As a Tree

At LSC | At Your School

Through music, movement, art, pictures, and writing, we will compare and contrast our bodies and our life history to those of trees.

NJSLS (Science): 1-LS3-1

Ch-Ch-Ch-Changes

At LSC | At Your School

Our planet is constantly being shaped by events that can happen very slowly over time, or quite suddenly. Using a model to represent land, students will simulate how earthquakes, volcanoes, and erosion can change the shape of the land around us.

NJSLS (Science): 2-ESS1-1

Shooting Hoops with Uncle Isaac

At LSC | At Your School

Want to shoot baskets like a pro? Engineer a catapult designed to push and pull your way toward this goal. Then analyze, compare, and test a friend's design. There is always more than one possible solution to a problem!

NJSLS (Science): K-2-ETS1-3

Flow Motion

At LSC | At Your School

Learn the basics of the water cycle in this highly interactive program. Through active listening, investigation, and kinesthetic role-play, students will understand the main processes of the water cycle, from the sun warming the Earth to the various forms water can take. Follow the leader as we become water droplets to model the water cycle and complete our journey.

NJSLS (Science): K-PS3-1

Light It Up!

At LSC

Plan and conduct investigations using flashlights and light boxes to focus on what it means for objects to be transparent, opaque, translucent, and reflective.

NJSLS (Science): 1-PS4-3

Ready, Set, Robotics!

At LSC | At Your School

Aspiring computer scientists, get ready for a hands-on introduction to the world of robotics. Observe how a small set of pieces can be disassembled and made into a variety of new robots!

NJSLS (Science): 2-PS1-3

What's the Matter?

At LSC | At Your School

Explore the world of chemistry with investigations that show how to classify materials by their observable properties. Learn to describe what happens when we cool matter using liquid nitrogen.

NJSLS (Science): 2-PS1-1, 2-PS1-4

TECH AND DESIGN STUDIO |45-MINUTE WORKSHOPS

NEW Rolling Robots with Sphero

At LSC

Inspire the innovators of the future with Sphero. In this program we cover the basics of coding a robot to navigate an obstacle course. Team up with a partner and develop a method to program your Sphero Bolt to navigate the maze in the least amount of time! How will your bot find its way through?

NJCCCS: Technology 8.1.2.A.4
ISTE: 4C

ELECTRONIC FIELD TRIPS | 45-MINUTE WORKSHOPS

Pollinators: Honey Bees

Online

Have you thanked a bee today? Pollinators provide an essential service to the ecosystem. At least a third of the world's agricultural crops depends on pollination provided by insects and other animals. Honey bees produce and store honey, but they also help to make other favorite foods. Design a pollination device that works just as hard as a busy bee.

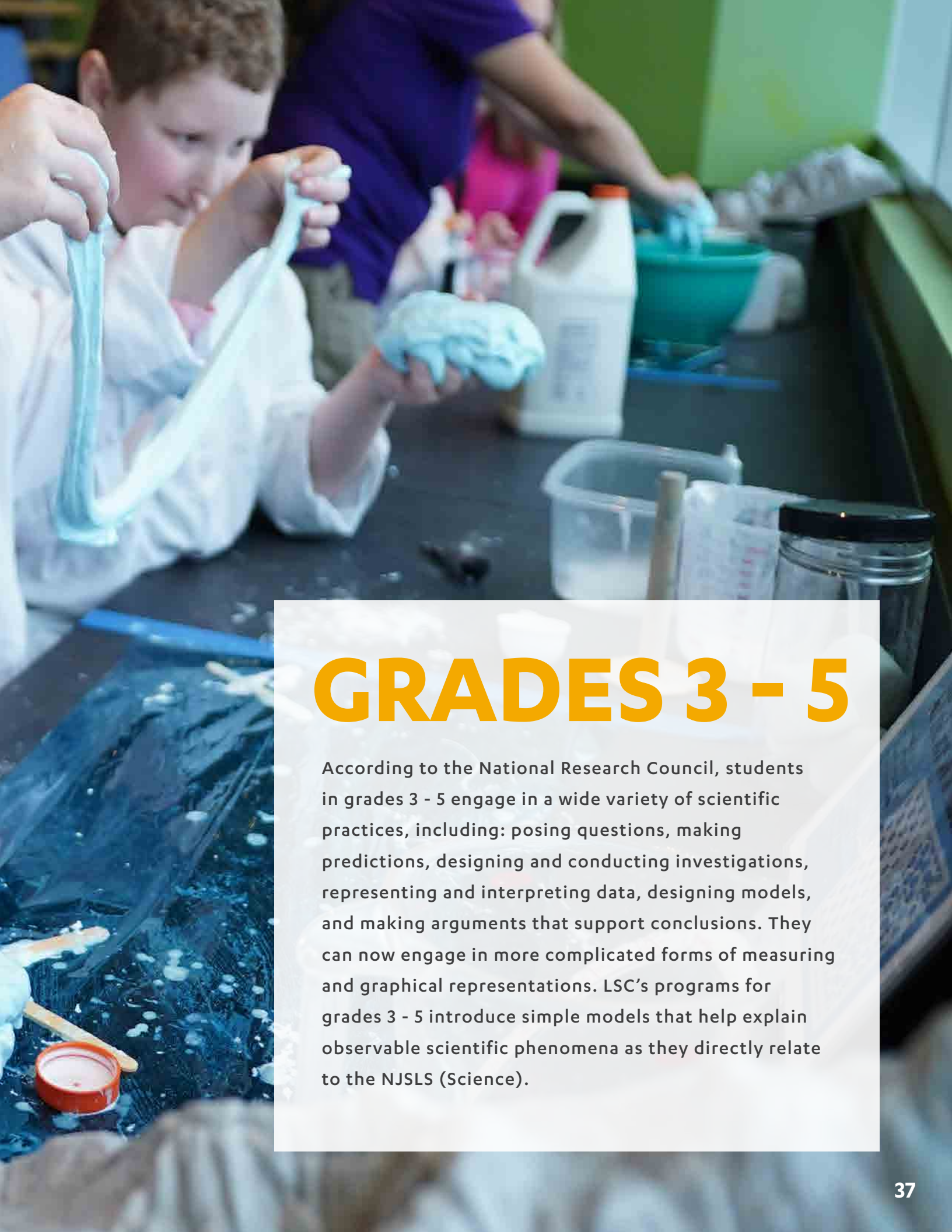
NJSLS (Science): 2-LS2-2

3D Design with Tinkercad

Online

Learn the basics of 3D design.

Prerequisites:
Each participant will need a computer, tablet, or iPad.
Participants must download open-source software (Tinkercad)
A document with directions on how to download Tinkercad will be provided.
NJSLS (Science): K-2-ETS1-2
ISTE: 6B
NJCCCS: Technology 8.1.2.E.1



GRADES 3 - 5

According to the National Research Council, students in grades 3 - 5 engage in a wide variety of scientific practices, including: posing questions, making predictions, designing and conducting investigations, representing and interpreting data, designing models, and making arguments that support conclusions. They can now engage in more complicated forms of measuring and graphical representations. LSC's programs for grades 3 - 5 introduce simple models that help explain observable scientific phenomena as they directly relate to the NJSLS (Science).

JENNIFER CHALSTY PLANETARIUM

Wonders of the Night Sky (Grades K - 12)

Using the unique immersive environment of the planetarium, students will explore Earth and space science concepts using the current night sky above New Jersey. Topics covered are correlated with objects visible in the night sky on your visit date and will include: seasonal constellations and planets, exciting deep-sky objects in the current sky, and breaking astronomical news.

NJSLS (Science): Topics discussed during the program will be correlated to the corresponding Earth and Space Science Performance Expectations for the grade level of the students attending the program.

Are We There Yet? (Grade 5)

Explore observations of the sun, planets, and stars to discover that objects in the universe are located at large distances from Earth and exhibit predictable cyclic patterns. Large objects can appear very small when they are located far from Earth. Discover that the sun is a star that appears larger and brighter than other stars because it is close. (30 min.)

NJSLS (Science): 5-ESS1-1

Cycles of the Seasons (Grade 5)

Students will observe the repeating pattern of the seasons and see how Earth's orbit around the sun and our planet's tilt combine to change the length of day and night over the course of the year. We'll also see how Earth's motion around the sun changes the stars visible from season to season. These astronomical phenomena will be explored from both the surface of Earth and outer space as we virtually leave the planet to give students a unique perspective that is possible only in the immersive environment of the planetarium. (30 min.)

NJSLS (Science): 5-ESS1-2; MS-ESS1-1

To Worlds Beyond (Grades 3 - 12)

This film takes you on a tour of all of the planets and many of the moons in the solar system, using the latest data from NASA. (35 min.)

NJSLS (Science) MS-ESS1-2

Black Holes: The Other Side of Infinity (Grades 4 - 12)

This film explores the nature of black holes, among the most mysterious objects in the universe. How do we know they exist? Where do they come from? What would it be like to get close to a black hole? (35 min.)

NJSLS (Science): Topics discussed during the program will be correlated to the corresponding Earth and Space Science Performance Expectations for the grade level of the students attending the program.

SCIENCE ON A SPHERE

Weather vs. Climate (Grade 3)

Earth data sets are used on the *Science on a Sphere* to explore climate changes over time and to explore how the short-term changes of weather are different from the long-term changes of climate.

NJSLS (Science): 3-ESS2-1; 3-ESS2-2

Introduction to Spheres (Grade 5)

Science on a Sphere brings vividly to life the nature of Earth Systems Science, exploring the geosphere, hydrosphere, atmosphere, and biosphere, and how these spheres interact with one another.

NJSLS (Science): 5-ESS2-1

LIVE FROM SURGERY

Live From Cardiac Surgery

At LSC

Students watch bypass or valve replacement surgery, performed at Morristown Medical Center. The program focuses on surgical procedure, risk factors for coronary artery disease, and careers in medicine.

Meet the Surgeon: Pediatric Orthopedics

At LSC | Online

Appearing in person, Dr. Samara Friedman discusses prerecorded surgeries which include the treatment of bone fractures, surgery of the knee, or pinning of the arm. During the session, Dr. Friedman will speak about her career path and other kinds of careers in medicine.

Meet the Surgeon: Neonatal

At LSC | Online

Appearing in person, Dr. Yi-horng Lee discusses prerecorded surgeries on the gastric tube placement (G-Tube). During the session, Dr. Lee will speak about how surgery on a small infant and child differ from surgery on an adult, teach about caloric needs and the developing child, and how digestion and the digestive system work. Explore a career path in neonatology and pediatric medicine.

NJSLS (Science): 3-LS3-2 , MS-LS1-3, MS-LS1-5, HS-LS3-1; NYCCLS: 1, 2, 3a, 3b, 5, 6 & 7; National Science Education Standards: M.C.1, M.C.1.f. & M.F.1.a; National Health Education Standards: 1.12.4 & 7.12.1

ASSEMBLY PROGRAMS

A Dose of Gross

At Your School

Your body carries out many "gross" functions like burping and sweating, but it does so for very important reasons. Take a journey through the human body to discover how your brain makes decisions, without your knowing it, to keep you healthy and strong by controlling the various organ systems of the body.

NJSLS (Science): 4-LS1-1

Science Circus

At Your School

It's our most popular show! Explore the positives and negatives of static electricity, the subzero temperatures of liquid nitrogen, the states of matter, and the immense pressure of air. Includes more than a dozen thrilling experiments and, as always, we use lots of volunteers. It's a great way to showcase the concepts of energy and matter.

NJSLS (Science): 3-PS2-3, 5-PS1-1

Flash! Bang!

At Your School

Arcs of electricity. Balls of fiery gas. Join us for an interactive look at the two most common forms of home energy. Students generate electricity, explore insulators and conductors, and participate in our very own game show, all while learning how to avoid the hazards inherent in using natural gas and electricity.

NJSLS (Science): 4-PS3-2

45-MINUTE WORKSHOPS

It Ain't Easy Being Green

At LSC | At Your School

Why is it so much hotter in a city than in the country in the summertime? Can we use plants to cool down? Learn about the urban heat island effect as you complete an engineering design challenge to create your very own model green roof!

NJSLS (Science): 4-PS3-4

Fight the Flood

At LSC

It's Mother Nature's world, we just live in it. Come learn how humans design and modify structures to resist extreme weather. Become a civil engineer and design a home that can withstand regular flooding.

NJSLS (Science): 3-ESS3-1, 4-ESS3-2

Adaptation Exploration

At LSC | At Your School

Could a polar bear survive in the middle of the Sahara Desert? Explore animal adaptations up close with live animal interactions. Discover how species have developed unique survival solutions to adapt to their environment in order to find food, protect themselves, or find a mate.

NJSLS (Science): 3-LS4-3, 3-LS3-2

Owl Pellet Dissection

At LSC | At Your School

Explore the diet of our favorite raptors by dissecting the undigested remains of their prey. Pairs team up to dissect their own owl pellet and identify what the owl consumed. This workshop is a great investigation of animal adaptations and an introduction to the food web.

NJSLS (Science): 3-LS4-3, 4-LS1-1

A Look Inside

At LSC | At Your School

What structures do our bodies have to help us survive? Find out the purpose of our skeleton and muscles and how our bones connect, and then add muscles to a model skeleton to see how different systems work together.

NJSLS (Science): 4-LS1-1

Electricity and Magnetism

At LSC | At Your School

Starting with the phenomenon of an electromagnet, students use many hands-on experiments to come to an understanding of the relationship between the forces of electricity and magnetism.

NJSLS (Science): 3-PS2-3, 5-PS1-1

The States of Matter

At Your School

Using super-cold liquid nitrogen and common household items, observe how things change from solid to liquid to gas. Construct explanations for the changes in this really cool exploration of matter.

NJSLS (Science): 5-PS1-1

Balls and Tracks

At LSC | At Your School

What forces of science help ski jumpers become champions? Using marbles and ramps, this hands-on program introduces the fundamental principles of gravitational forces and projectile motion. Investigate the path that a launched projectile takes, discover the patterns of this motion, and use data to predict the distance of a final launch!

NJSLS (Science): 3-PS2-2

It's a Slimy Time

At LSC

Investigate chemical and physical changes by making your own slime and experimenting with others! Get messy and have fun exploring their properties to help you engineer and create your ultimate slime.

NJSLS (Science): 5-PS1-4, 3-5-ETS1-1

Power of Air

At LSC | At Your School

Experience firsthand how surprisingly strong air can be! Conduct air pressure experiments in this interactive, station-based workshop. Discover the underlying principles of what makes wind, how suction cups work, and why airplanes fly.

NJSLS (Science): 3-PS2-1

Filter the Future

At LSC

How does tap water become so clean and clear? Conduct a variety of tests to determine whether a water sample is safe for human consumption. Then generate a solution to make the water sample as clean and clear as the water from your home faucets.

NJSLS (Science): 4-ESS3-2

Bee-Bot Robot Challenge

At LSC

Bee-Bots are programmable robots that follow a few basic rules called algorithms. Discover how algorithms can be used in conjunction with mathematics to develop a solution to a given problem.

NJSLS (Science): 3-5-ETS1-1

TECH & DESIGN STUDIO | 45-MINUTE WORKSHOPS

Digital Art Studio

At LSC

This intuitive S.T.E.A.M. toolset demonstrates how technology and art intersect. Explore color theory, lighting, and animation to create digital art or animation.

NJSLS (Science): 3-5 ETS1-3; NJCCCS: Technology 8.2.5.C.4; ISTE 1d, 2c, 4a, 4c, 4d, 6b;

ELECTRONIC FIELD TRIPS | 45-MINUTE WORKSHOP

3D Design with Tinkercad

Online

Learn the basics of 3D design in this course. Each student will need a computer and must download open-source software (Tinkercad). A document with directions on how to download Tinkercad will be provided.

NJSLS (Science): 3-5-ETS1-2;

NJCCCS: Technology: 8.1.5.A.1; ISTE 6b, c

Ants: The Original Farmers
Online
Get excited when the ants come marching one by one. Leaf-cutter ants will astonish you with their expertise in farming to support the survival of the group and with their proficiency in organizing matter in the environment.
NJSLS (Science): 3-LS2-1, 4-LS1-1, 5-LS2-1

Chemistry of Candy
Online (Kit Required)
Investigate chemistry with these sweet delights to explore chemical and physical changes, then separate materials based on their properties.
NJSLS (Science): 5-PS1-3

Geometry in Nature
Online
Classify different kinds of materials by their observable properties. Show how an understanding of shapes helps us every day. Cut out a 2D shape and form it into a 3D shape you can't do without!
NJSLS (Math):.3.G.A.1; NJSLS (Math):.4.G.A.3; NJSLS (Math):.5.G.B.3

90-MINUTE WORKSHOPS

Diversity of Life
At LSC
Explore the energy pyramid and learn about the relationships among producers, consumers, and decomposers. Interact with live plants and animals then explore the role fungi play in breaking down organisms and returning them to the soil.
NJSLS: 5-LS2-1

Swinging into the Past
At LSC
Jurassic times call for Jurassic measures! Put your paleo party shoes on for a trek into the past with a variety of hands-on fossil activities, including making your own fossil. Compare live animals to their past relatives to determine environments from long ago.
NJSLS (Science): 3-LS4-1, 3-LS4-3

Ocular Observations
At LSC
Follow light on its journey through the eye. In this very hands-on workshop. Perform cow eye dissections, gain a deeper understanding of how light gets from an object to the human eye, and explore how the shape of the lens bends light.
NJSLS (Science): 4-PS4-2

Matter Matters
At LSC
Discover that matter has unique properties by engaging in hands-on experiments to identify unknown substances. Investigate such concepts as electrical conductivity, chemical changes, solubility, and more.
NJSLS (Science): 5-PS1-3

Brainstorming Around the World
At LSC
Climatological data collection is a breeze for student meteorologists, who will use global data display units to explore the relationship between temperature, precipitation, and climate, and then create graphical representations of their data to classify climate zones.
NJSLS (Science): 3-ESS2-1, 3-ESS2-2.

Oh No, Oil Spill!
At LSC
Identify how oil spills adversely affect our environment and ways that human beings can build solutions.
NJSLS (Science): 3-5-ETS1-2, 5-ESS3-1

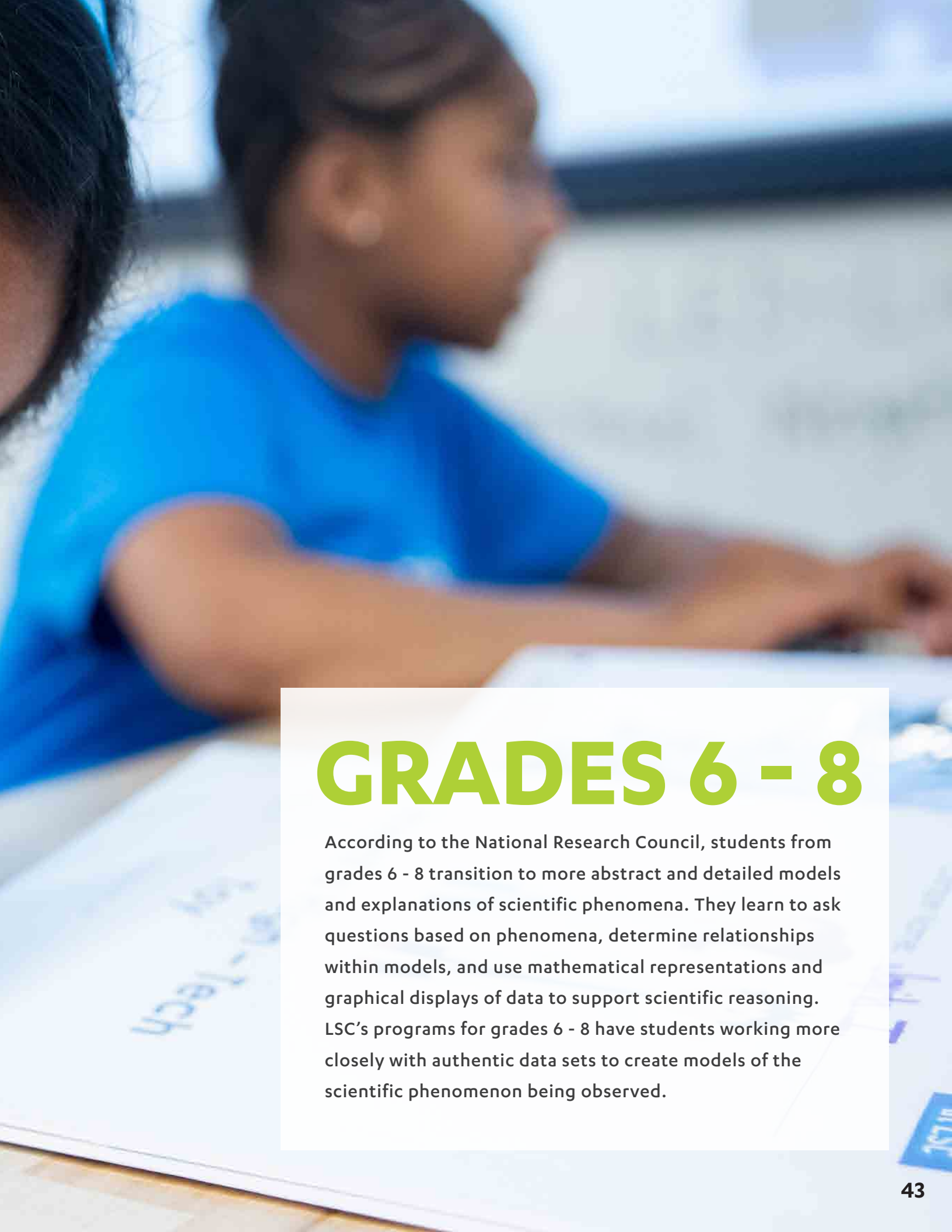
TECH & DESIGN STUDIO | 90-MINUTE WORKSHOPS

Intro to Game Design
At LSC
Design custom characters with animations and behaviors by completing a crash course in Stencyl. This platform sets a foundation of computational thinking—an essential skill in today's tech-driven world.
NJSLS (Science): 3-5-ETS1-3; NJCCCS: Technology: 8.1.5.A.1,8.1.5.D., 8.2.5.D.2, 8.2.5.E.3; ISTE:1c, 6b, 6d

NEW! The Game of Life: Understanding Ecology through Game Design
Explore ecosystems, food chains, and more in a whole new way. In this program, students will build and play games using the Bloxels platform to investigate concepts in ecology.
ISTE: 1d, 4b, 4c, 6b; NJSLS (Science): 5-LS2-1; NJCCCS:Technology: 8.1.5.A.1, 8.2.5.C.1; ISTE: 3c, 4c, 5c, 6c, 7c

NEW! Sphero Rovers: Mission to Mars!
At LSC
Can you create the next Mars rover design? In this program, use your engineering and design skills to create a Sphero-driven rover that can carry a payload across our simulated Mars surface. Once you have designed your rover, jump into the driver's seat and code your way through the tricky terrain!
NJCCCS: Technology: 8.1.5.A.1, 8.1.5.F.1, 8.2.5.C.7; ISTE: 3c, 4c, 5c, 6c, 7c

Digital Art Studio
At LSC
Explore color theory, lighting, and animation to create digital art or animation. This intuitive S.T.E.A.M. toolset is limited only by your imagination.
NJSLS (Science): 3-5 ETS1-3; NJCCCS: Technology 8.2.5.C.4; ISTE 1d, 2c, 4a, 4c, 4d, 6b;



GRADES 6 – 8

According to the National Research Council, students from grades 6 - 8 transition to more abstract and detailed models and explanations of scientific phenomena. They learn to ask questions based on phenomena, determine relationships within models, and use mathematical representations and graphical displays of data to support scientific reasoning. LSC's programs for grades 6 - 8 have students working more closely with authentic data sets to create models of the scientific phenomenon being observed.

JENNIFER CHALSTY PLANETARIUM

Wonders of the Night Sky Live! (Grades K - 12)

Using the unique immersive environment of the planetarium, students will explore Earth and space science concepts using the current night sky above New Jersey. Topics covered are correlated with objects visible in the night sky on your visit date and will include seasonal constellations and planets, exciting deep-sky objects in the current sky, and breaking astronomical news.

NJSLS (Science): Topics discussed during the program will be correlated to the corresponding Earth and Space Science Performance Expectations for the grade level of the students attending the program.

Cycles of the Seasons (Grades 5 - 8)

Students will observe the repeating pattern of the seasons and see how Earth's orbit around the sun and our planet's tilt combine to change the length of day and night over the course of the year. We'll also see how Earth's motion around the sun changes the stars visible from season to season. These astronomical phenomena will be explored from both the surface of Earth and outer space as we virtually leave the planet to give students a unique perspective that is possible only in the immersive environment of the planetarium. (30 min.)

NJSLS (Science): 5-ESS1-2; MS-ESS1-1

Phases and Eclipses (Grades 6 - 8)

Students will observe the changes in the moon's phases as a month goes by, and will develop a conceptual model of the cyclic patterns of lunar phases and of eclipses of the sun and moon. These astronomical phenomena will be explored from both the surface of Earth and outer space as we virtually leave the planet to give students a unique perspective that is only possible in the immersive environment of the planetarium. (30 min.)

NJSLS (Science): MS-ESS1-1

Black Holes: The Other Side of Infinity (Grades 4 - 12)

This film explores the nature of black holes, among the most mysterious objects in the universe. How do we know they exist? Where do they come from? What would it be like to get close to a black hole? (35 min.)

NJSLS (Science): Topics discussed during the program will be correlated to the corresponding Earth and Space Science Performance Expectations for the grade level of the students attending the program.

To Worlds Beyond (Grades 3 - 12)

This film takes you on a tour of all of the planets and many of the moons in the solar system, using the latest data from NASA. (35 min.)

NJSLS (Science): MS-ESS1-3

SCIENCE ON A SPHERE

Changing Earth (Grades 6 - 8)

Science on a Sphere is ideal for vividly illustrating the large-scale forces that drive our planet, including the motion of the plates. Students will explore how Earth's appearance has changed over the long span due to plate motion, in a journey going back to the days of the dinosaurs.

NJSLS (Science): MS-ESS1-4; MS-ESS2-3

LIVE FROM SURGERY

Live From Cardiac Surgery | 2.5 hours

At LSC

Students watch bypass or valve replacement surgery, performed at Morristown Medical Center. The program focuses on surgical procedure, risk factors for coronary artery disease, and careers in medicine.

Meet the Surgeon: Pediatric Orthopedics | 2.5 hours

At LSC | Online

Appearing in person, Dr. Samara Friedman discusses prerecorded surgeries which include the treatment of bone fractures, surgery of the knee, or pinning of the arm. During the session, Dr. Friedman will speak about her career path and other kinds of careers in medicine.

Meet the Surgeon: Neonatal | 2.5 hours

At LSC | Online

Appearing in person, Dr. Yi-horng Lee discusses prerecorded surgeries on the gastric tube placement (G-Tube). During the session, Dr. Lee will speak about how surgery on a small infant and child differ from surgery on an adult, teach about caloric needs and the developing child, and how digestion and the digestive system works. Explore a career path in neonatology and pediatric medicine.

Meet the Surgeon: Heart Transplant | 2.5 hours

At LSC | Online

Appearing in person, Margarita T. Camacho, MD, discusses prerecorded heart transplant surgeries. She discusses risk factors for heart disease, mechanical hearts and assistive devices, and new cardiac transplant technologies and procedures. Learn about the organ donation process and analyze data from past research on mechanical devices.

Live From Kidney Transplant | 2.5 hours

At LSC | Online

Students witness the gift of life shared between two people as they observe the surgical team remove a donor kidney, prepare it for transplantation, take it to an adjacent operating room, and sew it into a recipient. When the donated kidney is attached to the patient's blood supply and becomes pink, many students experience a profound sense of wonder and elation.

Neurosurgery | 3 hours

At LSC | Online

Students watch as delicate neurosurgery is performed to extract tumors from the brain or pituitary glands, repair spinal column damage, implant brain pacemakers to provide deep electrical stimulation to Parkinson's patients, or deflate dangerously ballooning aneurysms. Some operations even include removing the top of the skull, fully exposing the cranium.

Robotic Surgery | 2.5 hours

At LSC | Online

This program focuses on the engineering and design of high-end medical equipment, like the Da Vinci Robotic Surgical System, and its application in partially removing a tumor from a kidney or related urological procedure. During the program you will see a live surgery and speak to the surgical team as they perform surgery.

NJSLS (Science): 3-LS3-2, MS-LS1-3, MS-LS1-5, HS-LS3-1; NYCCLS: 1, 2, 3a, 3b, 5, 6 & 7; National Science Education Standards: M.C.1, M.C.1.f. & M.F.1.a; National Health Education Standards: 1.12.4 & 7.12.1

ASSEMBLY PROGRAMS

Science Sportacular

At Your School

Sports all have one thing in common—science. We demonstrate Newton's Laws and cause and effect using sports equipment. Students learn how a pitcher makes a baseball curve and volunteers join in a momentum race. We even demonstrate concepts related to helmet safety by lying on a bed of sharp nails. No tricks or illusions here, just pure science.

NJSLS (Science): MS-PS2-2

Science of Flight

At Your School

Most of us have probably wondered how aircraft fly. While it might seem impossible or magical, it's really just science. Take a closer look at the four forces of flight and aviation in an educational and entertaining way!

NJSLS (Science): MS-PS2-2

Science Circus

At Your School

It's our most popular show! Explore the positives and negatives of static electricity, the subzero temperatures of liquid nitrogen, the states of matter, and the immense pressure of air. Includes more than a dozen thrilling experiments and, as always, we use lots of volunteers. It's a great way to showcase the concepts of energy and matter.

NJSLS (Science): MS-PS1-4

45-MINUTE WORKSHOPS

BRAAINS! You and the Zombie

At LSC | At Your School

Join the Zombie Response Team as research scientists to help explain how a mutated strain of the zombie virus is altering zombie behavior. By identifying and explaining differences in behavior and capabilities of zombies and humans, learn to form scientific explanations while gaining a better understanding of how the brain works.

NJSLS (Science): MS-LS1-5

Cow Eye Dissection

At LSC | At Your School

Follow light on its journey through the eye. Students will pair off to perform cow eye dissections and gain a deeper understanding of the structure and function of the human eye.

NJSLS (Science): MS-LS1-8 , MS-LS4-2

Walking into the Present

At LSC | At Your School

What did early humans look like? How closely are humans related to gorillas? How do we determine how old a fossil is? Discover the answers to these questions and more as students measure, compare, and organize hominid skulls into a family tree.

NJSLS (Science): MS-LS4-2

Living or NOT!

At LSC

Using state-of-the-art microscopes, discover the characteristics of living things, investigate different types of single-celled and multicellular organisms, and make arguments supported by evidence to determine whether something is living or nonliving.

NJSLS (Science): MS-LS1-1

Energy: Use It and Lose It!

At LSC | At Your School

Energy comes in many forms. We use it, and lose it, every day. Through hands-on stations, use models and complete experiments to track energy flow in a series of transformations that produce both useful actions and losses.

NJSLS (Science): MS-PS3-5

It's All about Reactions

At LSC | At Your School

Conduct an inquiry-based set of experiments using chemical reactions to analyze and interpret data on the properties of unknown substances.

NJSLS (Science): MS-PS1-2

MAKERLAB | 45-MINUTE WORKSHOPS

Intro to Tinkercad

At LSC

Engage in online digital creation of 3D models and learn how to create intricate pieces designed for 3D printing using Autodesk Tinkercad. Using our Monoprice Mini Select printers, print a personal design that's yours to keep.

NJSLS : MS-ETS1-4; NJCCCS: Technology: 8.1.8.D.3, 8.2.8.E.1; ISTE 6b, c;

NEW! Leather and Lasers

At LSC

This class covers the process of leather working and lasers. Each student will get a laser-cut piece of leather then learn to perform real leather-working on it and take it home.

NJSLS: MS-PS1-3; ISTE: 4C

TECH AND DESIGN STUDIO | 45-MINUTE WORKSHOPS

Digital Art Studio

At LSC

Explore color theory, lighting, and animation to create digital art or animation with this intuitive S.T.E.A.M. toolset.

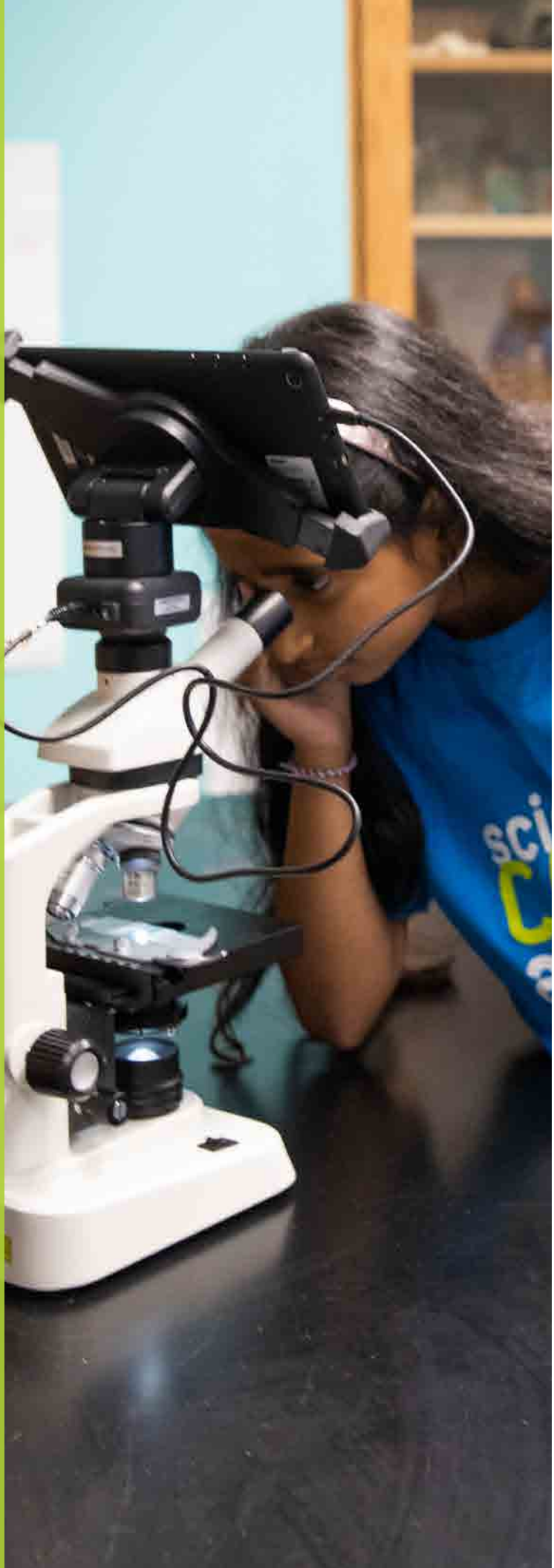
NJSLS: MS-ETS1-2; NJCCCS: Technology: 8.2.8.E.1; ISTE 1d, 2c, 4a, 4c,4d, 6b

NEW! Arduino Circuits

At LSC | Online (Kit Required)

Learn about circuitry and how to code for Arduino. This microcontroller is great for beginners but flexible enough to provide additional challenges for more knowledgeable students.

NJSLS (Science): MS-ETS1-2; NJCCCS:Technology: 8.2.8.E.1, 8.2.8.E.2; ISTE 1c,1d, 4a,4b, 4c, 4d, 5d, 6b, 7c 7d



Program, Aim, Fire

At LSC

Plan, test, and automate your high-flying ideas using a programmable catapult. Are you up to the challenge?

NJSLS MS-PS2-1,MS-ETS1-2; NJCCCS:Technology: 8.2.8.A.1, 8.2.8.C.6, 8.2.8.D.3; ISTE:1.b

ELECTRONIC FIELD TRIPS | 45-MINUTE WORKSHOP

Renewable Energy

Online

While such nonrenewable energy sources as coal and oil dwindle, we need to look to other sources such as sun, wind, and water. Explore our *Energy Quest* gallery and experiment with a variety of renewable energy sources

NJSLS (Science): MS-PS3-4

3D Design with Tinkercad

Online

Learn the basics of 3D design in this course. Each student will need a computer and must download open source software (Tinkercad). A document with directions on how to download Tinkercad will be provided.

NJSLS : MS-ETS1-4; NJCCCS: Technology: 8.1.8.D.3, 8.2.8.E.1; ISTE 6b, c;

NEW! Arduino Circuits (60 min.)

Online (Kit Required)

Learn about circuitry and how to code for Arduino. This microcontroller is great for beginners but flexible enough to provide additional challenges for more knowledgeable students.

NJSLS (Science): MS-ETS1-2; NJCCCS:Technology: 8.2.8.E.1, 8.2.8.E.2; ISTE 1c,1d, 4a,4b, 4c, 4d, 5d, 6b, 7c 7d

Forensic Science: Gotham Detective Kit (60 min.)

Online (Kit Required)

Conduct an investigation and analyze evidence to build a case against one of the city's notorious criminal masterminds before it's too late. This program includes a kit and a 45-to-60-minute videoconference.

NJSLS (Science): MS-PS1-3, Structure and Function: HS-LS1-3

NEW! Mystery at the Hotel Philadelphia Kit (60 min.)

Online (Kit Required)

Conduct an investigation, collect and analyze evidence to identify a pathogen, and solve this deadly mystery. This program includes a kit and a 60-minute videoconference.

NJSLS: MS-PS1-3

90-MINUTE WORKSHOPS

The Case of the Silver Monkey

At LSC

LSC has lost a valuable artifact and we need your help! Become forensic investigators as you examine fingerprints, study shoeprints, delve into blood typing, and put all your knowledge together to nab the thief and solve the Case of the Silver Monkey!

NJSLS: MS-ETS1-1, MS-ETS1-3

Trouble on the Waterfront

At LSC

A small town just opened an automotive factory by an old water reservoir. Test a water sample to determine if the water is safe for use, then budget limited resources to decide which treatments must be purchased to purify the water.

NJSLS: MS-LS2-5, MS-ETS1-2

Project Skyscraper

At LSC

This workshop begins with a mini engineering design challenge before students manipulate surveying equipment and explore real-world applications of mathematical concepts. Students will also be asked to put their skills to the test and work collaboratively to build a scale model of One World Trade Center. Math concepts in this program include measurement, proportions, and scaling.

NJSLS: MS-ETS1-3

MAKERLAB | 90-MINUTE WORKSHOPS

Aviation: From Paper Airplanes to Drones

At LSC

This is drone training 101. Learn basic concepts of flight and apply this knowledge through hands-on experiences like using flight experiments and flying micro pocket drones.

NJSLS: MS-PS2-1; ISTE: 1c

Mars Terraforming

At LSC

Can humans overcome Mars's harsh environment and live there one day? Design a habitat for life on Mars based on a topographic map which resembles a real Martian location, then 3D print a model of your Martian home.

NJSLS: MS-LS2-3; NJCCCS: Technology: 8.2.8.D.2; ISTE 6b, c

Intro to Tinkercad

At LSC

Engage in online digital creations of 3D models and learn how to create intricate pieces designed for 3D printing using Autodesk Tinkercad. Then, using our Monoprice Mini Select printers, print a personal design that's yours to keep.

NJSLS : MS-ETS1-4; NJCCCS: Technology: 8.1.8.D.3, 8.2.8.E.1: ISTE 6b, c

Bridge Engineering: Engineering & Design Challenge

At LSC

Your group will be engaged in advanced 3D design of bridges with Autodesk Tinkercad. Learn to work in collaborative groups to solve complex problems using 3D printers.

NJSLS: MS-ETS1-4; NJCCCS:Technology 8.2.8.D.3

Fish Evolution: Engineering & Design Challenge

At LSC

Your group will be engaged in advanced 3D design of a fish's body with Autodesk Tinkercad. Learn to work in collaborative groups to solve complex problems using 3D printers.

NJSLS: MS-ETS1-4; NJCCCS:Technology 8.2.8.D.3

Derby Car Racing: Engineering & Design Challenge

At LSC

Your group will be engaged in advanced 3D design of a derby racer with Autodesk Tinkercad. Learn to work in collaborative groups to solve complex problems using 3D printers.

NJSLS: MS-ETS1-4; NJCCCS:Technology 8.2.8.D.3

NEW! Virtual Reality and Your Brain

At LSC

Ever want to know what it would be like to stand on an I-beam a few hundred feet in the air without safety gear? Through the use of the HTC Vive and other tools, students will learn how their brain perceives reality and why VR is such an immersive technology.

NJSLS: MS- LS1-8; NJCCCS: Technology: 8.2.8.B.2, 8.2.8.E.2; ISTE 6C

TECH & DESIGN STUDIO | 90-MINUTE WORKSHOPS

Intro to Game Design

At LSC

Design custom characters with animations and behaviors by completing a crash course in Stencyl. This intuitive toolset is limited only by your creativity. This platform sets a foundation of computational thinking—an essential skill in today's tech-driven world.

NJSLS (Science): MS-ETS1-2; NJCCCS:Technology: 8.2.8.E.1, 8.2.8.C.1, 8.2.8.C.2, 8.2.8.E.4, ISTE 1d,4a,4b,4c,6b

Digital Art Studio

At LSC

Explore color theory, lighting, and animation to create digital art or animation with this intuitive S.T.E.A.M. toolset.

NJSLS:MS-ETS1-3; NJCCCS: Technology: 8.2.8.E.1; ISTE 1d, 2c, 4a, 4c, 4d, 6b

Arduino Circuits

At LSC | Online (Kit Required)

Learn about circuitry and how to code for Arduino. This microcontroller is great for beginners but flexible enough to provide additional challenges for more knowledgeable students.

NJSLS (Science): MS-ETS1-2; NJCCCS:Technology: 8.2.8.E.1, 8.2.8.E.2; ISTE 1c,1d, 4a,4b, 4c, 4d, 5d, 6b, 7c 7d

Program, Aim, Fire

At LSC

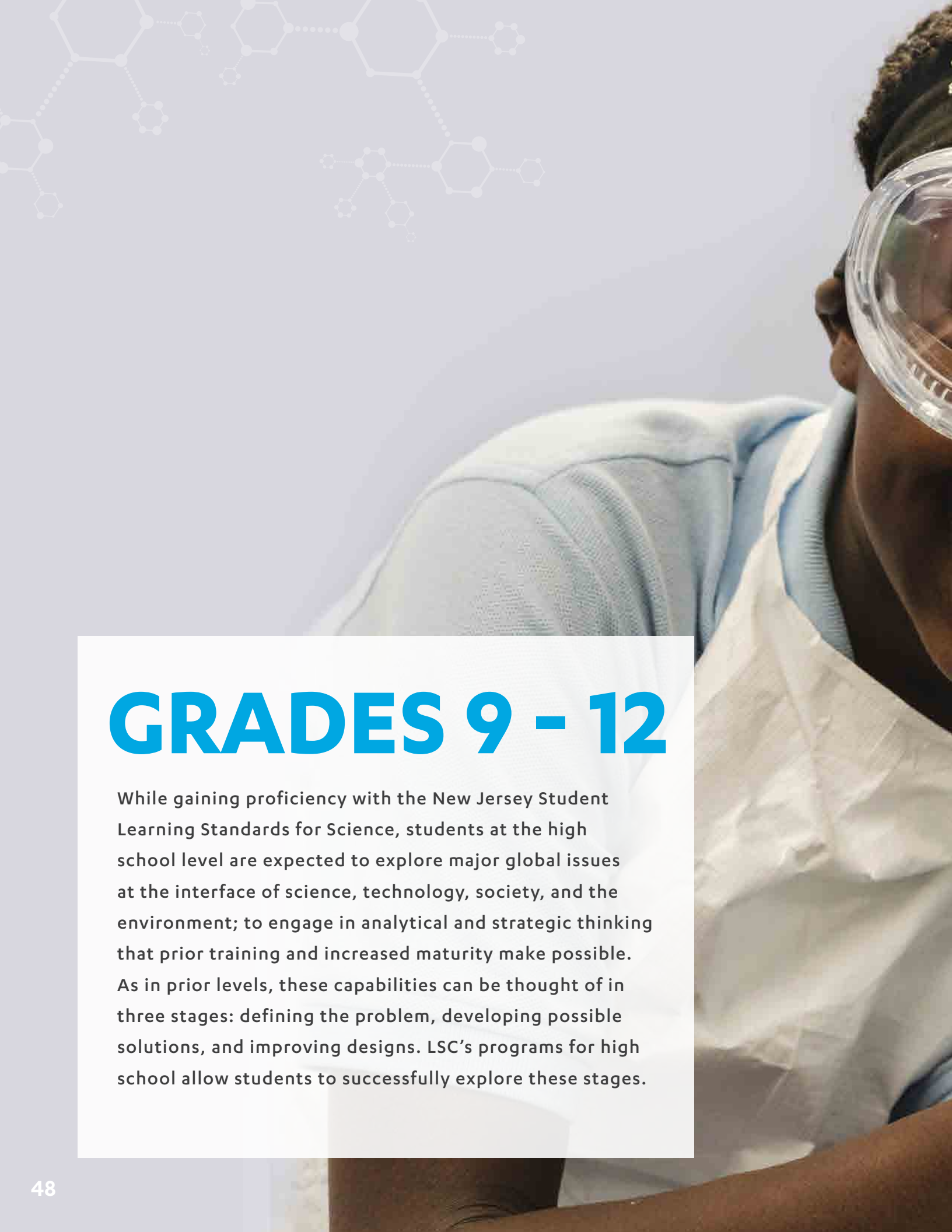
Plan, test, and automate your high-flying ideas using a programmable catapult. Identify possible solutions to operational constraints then, through the use of the engineering design process, improve the accuracy and distance. Are you up to the challenge?

NJSLS: MS-PS2-1, MS-ETS1-4; NJCCCS:Technology: 8.2.8.A.1, 8.2.8.C.6, 8.2.8.D.3; ISTE:1.b

NEW! Intro to Robotics Coding with Sphero

Want to see your code come to life? In this program we cover the basics of coding a robot to navigate an obstacle course. Team up with a partner and develop a method to program your Sphero Bolt to navigate a maze in the least amount of time! How will your bot find its way through?

NJSLS: MS-ETS1-1; NJCCCS: Technology: 8.1.8.A.3, 8.2.8.C.1



GRADES 9 – 12

While gaining proficiency with the New Jersey Student Learning Standards for Science, students at the high school level are expected to explore major global issues at the interface of science, technology, society, and the environment; to engage in analytical and strategic thinking that prior training and increased maturity make possible. As in prior levels, these capabilities can be thought of in three stages: defining the problem, developing possible solutions, and improving designs. LSC's programs for high school allow students to successfully explore these stages.

JENNIFER CHALSTY PLANETARIUM

Wonders of the Night Sky Live! (Grades K - 12)

Using the unique immersive environment of the planetarium, students will explore Earth and space science concepts using the current night sky above New Jersey. Topics covered are correlated with objects visible in the night sky on your visit date and will include: seasonal constellations and planets, exciting deep-sky objects in the current sky, and breaking astronomical news.

NJSLS (Science): Topics discussed during the program will be correlated to the Earth and Space Science Performance Expectations for the grade level of the students attending the program.

Life Cycles of the Stars (Grades 9 - 12)

Develop a conceptual model of the formation of the universe and the life cycle of a star. Construction of this model will use evidence from stellar light spectra, the motion of distant galaxies, the composition of matter in the universe, nuclear fusion, and the production of elements in stars. The immersive environment of the planetarium allows students to travel back in time to the formation of the universe to explore these space science phenomena. (30 min.)

NJSLS (Science): HS-ESS1-1, HS-ESS1-2, HS-ESS1-3

Black Holes: The Other Side of Infinity (Grades 4 - 12)

This film explores the nature of black holes, among the most mysterious objects in the universe. How do we know they exist? Where do they come from? What would it be like to get close to a black hole? (35 min.)

NJSLS (Science): Topics discussed during the program will be correlated to the Earth and Space Science Performance Expectations for the grade level of the students attending the program.

To Worlds Beyond (Grades 3 - 12)

This film takes you on a tour of all of the planets and many of the moons in the solar system, using the latest data from NASA. (35 min.)

NJSLS (Science) HS-ESS1-4

SCIENCE ON A SPHERE

Violent Planet (Grades 9 - 12)

From our planet's currently active volcanoes and earthquakes to Earth's distant past, this program uses *Science on a Sphere* to explore the often-violent forces that have shaped our planet.

NJSLS (Science): HS-ESS2-1

LIVE FROM SURGERY

Live From Cardiac Surgery | 2.5 hours

At LSC

Students watch bypass or valve replacement surgery, performed at Morristown Medical Center. The program focuses on surgical procedure, risk factors for coronary artery disease, and careers in medicine.

Meet the Surgeon: Pediatric Orthopedics | 2.5 hours

At LSC | Online

Appearing in person, Dr. Samara Friedman discusses prerecorded surgeries which include the treatment of bone fractures, surgery of the knee, or pinning of the arm. During the session, Dr. Friedman will speak about her career path and other kinds of careers in medicine.

Meet the Surgeon: Neonatal | 2.5 hours

At LSC | Online

Appearing in person, Dr. Yi-horng Lee discusses prerecorded surgeries on the gastric tube placement (G-Tube). During the session, Dr. Lee will speak about how surgery on a small infant and child differ from surgery on an adult, teach about caloric needs and the developing child, and how digestion and the digestive system works. Explore a career path in neonatology and pediatric medicine.

Meet the Surgeon: Heart Transplant | 2.5 hours

At LSC | Online

Appearing in person, Margarita T. Camacho, MD, discusses prerecorded heart transplant surgeries. She discusses risk factors for heart disease, mechanical hearts and assistive devices, and new cardiac transplant technologies and procedures. Learn about the organ donation process and analyze data from past research on mechanical devices.

Live From Kidney Transplant | 2.5 hours

At LSC | Online

Students witness the gift of life shared between two people as they observe the surgical team remove a donor kidney, prepare it for transplantation, take it to an adjacent operating room, and sew it into a recipient. When the donated kidney is attached to the patient's blood supply and becomes pink, many students experience a profound sense of wonder and elation.

Neurosurgery | 3 hours

At LSC | Online

Students watch as delicate neurosurgery is performed to extract tumors from the brain or pituitary glands, repair spinal column damage, implant brain pacemakers to provide deep electrical stimulation to Parkinson's patients, or deflate dangerously ballooning aneurysms. Some operations even include removing the top of the skull, fully exposing the cranium.

Robotic Surgery | 2.5 hours

At LSC | Online

This program focuses on the engineering and design of high-end medical equipment, like the Da Vinci Robotic Surgical System, and its application in partially removing a tumor from a kidney or related urological procedure. During the program you will see a live surgery and speak to the surgical team as they perform surgery.

NJSLS (Science): 3-LS3-2, MS-LS1-3, MS-LS1-5, HS-LS3-1; NYCCLS: 1, 2, 3a, 3b, 5, 6 & 7; National Science Education Standards: M.C.1, M.C.1.f. & M.F.1.a; National Health Education Standards: 1.12.4 & 7.12.1

90-MINUTE WORKSHOPS

Physics of Car Crashes

At LSC

Explore the physics of car crashes and safety devices through the study of varying types of collisions (elastic and inelastic), force, and impact time. This exploration will

guide your students to use Vernier sensors to engineer and analyze their own device which will survive the impact of a 'crash.'

NJSLS: HS-PS2-3

Our Water Systems: What's in Our Water?

At LSC

Where does the water we use come from, where does it go, and what happens to it along the way? Students explore our water systems through a gallery format, becoming an "expert" on a contributing aspect such as eutrophication, combined sewage overflow, pH levels, and marine life in New York Harbor. Students then test local water from the Hudson River as well as our tap water, comparing the results to EPA guidelines.

NJSLS: HS-ESS3-1

Animal Behavior

At LSC

What is a behavior? Can we influence it? Observe our tamarins and your fellow humans as you learn how to decipher and record animal behaviors. Then discover how to influence behavior as you design an experimental habitat for a live Madagascar hissing cockroach! Are humans animals with behaviors that can be manipulated?

NJSLS: HS-LS2-8

Stabilizing the System

At LSC

Learn about homeostasis and feedback mechanisms as you use Vernier sensors to observe and analyze your own heart rate, lung capacity, blood pressure, and more.

NJSLS: HS-LS1-3

Forensic Anthropology

At LSC

Tibia or not tibia, that is the question! Learn to observe and identify the bones and features that make us unique. Tell the story of a human by reading the patterns in various skeletal features. Then, solve an archaeological crime by using clues dug up from Earth to determine whether you're dealing with a funeral or a fraud.

NJSLS: HS-ETS1-2

Unlocking Your DNA

At LSC

Discover the world of genetics as you explore the human genome. Use hands-on lab techniques and lab equipment such as micro-pipettes, centrifuges, and gel electrophoresis chambers as you solve a genetic mystery.

NJSLS: HS-LS3-1, HS-LS4-3

Chemical Investigations

At LSC

Can we predict properties by looking at the periodic table? Melt, dissolve, break, and electrify chemicals; learn how different bond types are classified; and use your knowledge to identify how an unknown substance will behave by observing only its chemical formula.

NJSLS: HS-PS1-1

MAKERLAB | 90-MINUTE WORKSHOPS

Aviation: From Paper Airplanes to Drones

At LSC

This is drone training 101. Learn basic concepts of flight and apply this knowledge through hands-on experiences like using flight experiments and micro pocket drones.

NJSLS: HS-PS2-1, HS-PS2-2; ISTE: 1c

NEW! Virtual Reality and Your Brain

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NJSLS: HS-LS1-3; ISTE 6C

Mars Terraforming

At LSC

Can humans overcome Mars's harsh environment and live there one day? Design a habitat for life on Mars based on a topographic map which resembles a real Martian location, then 3D print a model of your Martian home.

NJSLS:HS-ESS3-2; NJCCCS: Technology:8.2.12.A.1; ISTE 6b,c

Intro to Tinkercad

At LSC

Engage in online digital creations of 3D models and learn how to create intricate pieces designed for 3D printing using Autodesk Tinkercad. Then use our Monoprice Mini Select printers to print a personal design that's yours to keep.

NJSLS:HS-ETS1-2; NJCCS:Technology:8.2.12.D.3; ISTE 6b,c

Bridge Engineering: Engineering & Design Challenge

At LSC

Your group will be engaged in advanced 3D design of bridges with Autodesk Tinkercad. Learn to work in collaborative groups to solve complex problems using 3D printers.

NJSLS: HS-ETS-4; NJCCCS:Technology 8.2.12.C.5, 8.2.12.D.1

Fish Evolution: Engineering & Design Challenge

At LSC

Your group will be engaged in advanced 3D design of a fish's body with Autodesk Tinkercad. Learn to work in collaborative groups to solve complex problems using 3D printers.

NJSLS: HS-LS4-2; NJCCCS:Technology 8.2.12.C.5, 8.2.12.D.1

Derby Car Racing: Engineering & Design Challenge

At LSC

Your group will be engaged in advanced 3D design of a derby racer with Autodesk Tinkercad. Learn to work in collaborative groups to solve complex problems using 3D printers.

NJSLS: HS-PS2-3; NJCCCS:Technology 8.2.12.C.5, 8.2.12.D.1

TECH & DESIGN STUDIO WORKSHOPS

Intro to Game Design

At LSC

Design custom characters with animations and behaviors by completing a crash course in Stencyl. This intuitive toolset is limited only by your creativity. This platform sets a foundation of computational thinking—an essential skill in today's tech-driven world.

NJSLS: HS-ETS1-4; NJCCCS: Technology: 8.2.12.E.3, 8.2.12.E.4; ISTE 1d, 4a, 4b, 4c, 6b

NEW! Unreal Creations! Designing a Game with Unreal Engine | 2 hours

At LSC

Level up your skills in this game design and programming primer course using industry-level tools! Take the first step into professional-level game design as you learn how to set up your first project in Unreal Engine and learn the basics of coding in C++. Some programming experience is recommended for this class.

NJSLS: HS-ETS1-4; NJCCCS: Technology: 8.2.12.E.3, 8.2.12.E.4; ISTE 1d, 4a, 4b, 4c, 6b

NEW! Advanced 3D Modeling with Autodesk Maya | 90 min. or 2 hours

In this program exploring advanced 3D modeling, students will learn the techniques and methods used professionally to create 3D models and meshes. Students will leave with access to a digital model that they have created (requires access to a Google Drive account or similar file-storage service).

NJSLS: HS-ETS1-2; NJCCCS: Technology: 8.2.12.D.3; ISTE 6b, c

Arduino Circuits

At LSC | Online (kit required)

Learn about circuitry and how to code for Arduino. This microcontroller is great for beginners but flexible enough to provide additional challenges for more knowledgeable students.

NJSLS: HS-ETS1-3; NJCCCS:Technology: 8.2.12.E.3, 8.2.12.E.4; ISTE 1c, 1d, 4a, 4b, 4c, 4d, 5d, 6b, 7c 7d

NEW! Sphero Rovers: Mission to Mars! | 90 min.

At LSC

Can you create the next Mars rover design? In this program use your engineering and design skills to create a Sphero driven rover that can carry a payload across our simulated Mars surface. Once you have designed your rover, jump into the driver's seat and code your way through the tricky terrain!

NJSLS: HS-ETS1-1; NJCCCS: Technology: 8.1.8.A.3, 8.2.8.C.1

ELECTRONIC FIELD TRIPS

Forensic Science: Gotham Detective Kit | 60 min.

Online (Kit Required)

This program includes a kit and a 45-to-60-minute videoconference. Conduct an investigation and analyze evidence to build a case against one of the city's notorious criminal masterminds before it's too late.

NJSLS (Science): HS-LS1-3

NEW! Arduino Circuits | 60 min.

Online

Learn about circuitry and how to code for Arduino. This microcontroller is great for beginners but flexible enough to provide additional challenges for more knowledgeable students.

NJSLS: HS-ETS1-2; NJCCCS:Technology: 8.2.12.E.3, 8.2.12.E.4; ISTE 1c, 1d, 4a, 4b, 4c, 4d, 5d, 6b, 7c 7d

NEW! Mystery at the Hotel Philadelphia | 60 min.

Online (Kit Required)

This program includes a kit and a 60-minute videoconference. Conduct an investigation; collect and analyze evidence to identify a pathogen and solve this deadly mystery.

NJSLS: HS-LS1-3

TEACHER PROFESSIONAL DEVELOPMENT WORKSHOPS

Teachers face new challenges as the NJSLS continue to be adopted and implemented. With an increased emphasis on evidence-based learning, exploration of science phenomena, and scientific discourse, educators need professional development experiences that reflect these new focal points of learning. Liberty Science Center can partner with your school or district to offer engaging and effective professional development programs tailored to implementing the NJSLS.

You can even combine PD with student programs, including Electronic Field Trips and Extended Laboratory Workshops, to observe and learn from LSC educators in real time, with real students.

To learn more, contact Mary McDonald at mmcdonald@lsc.org or 201.253.1214.

Last year, 2,050 science teachers participated in LSC's professional development programs.

DEEP DIVE INTO THE NGSS WORKSHOPS

These workshops offer comprehensive training for teachers in unpacking the **Next Generation Science Standards**, also known as the **New Jersey Student Learning Standards for Science** and **New York State Science Learning Standards**. Participants experience and reflect upon the standards-based shifts for classroom instruction.

NGSS Overview: Teaching Science in Three Dimensions

This workshop introduces the Next Generation Science Standards, highlighting key shifts in content and practices that the new standards bring to classrooms. Educators will become familiar with teaching through the three dimensions of NGSS: Disciplinary Core Ideas, Science and Engineering Practices, and Crosscutting Concepts. Participate in hands-on activities that illustrate how the standards support inquiry. Discuss and revise activities to effectively support the standards and meet performance expectations.

Teaching Science with Crosscutting Concepts

Elevate your teaching practice during this interactive workshop focusing on the key third dimension of the NGSS (NJSLS-S). Explore and discuss the Crosscutting Concepts through several hands-on activities, including investigations and card sorts. Modify your existing lessons to incorporate relevant Crosscutting Concepts.

Phenomena-Based Classrooms

Explore NGSS (NJSLS-S) phenomena, which are designed to motivate students to figure out why something happens in order to build three-dimensional understanding. We will explore phenomena rooted in compelling real-world situations, including hands-on investigations and local exploration.

Asking Questions and Planning Investigations

This workshop focuses on two Science and Engineering Practices: Asking Questions and Planning and Carrying Out Investigations. Engage in different questioning protocols and participate in investigations that highlight the synergy of these two practices. Reflect on the inquiry-based science investigations in order to modify existing science lessons.

Analyzing and Interpreting Data

Investigate ideas through the Science Practice of Analyzing and Interpreting Data as well as the Crosscutting Concept of Patterns. Engage in hands-on activities and carry out investigations that highlight the importance of qualitative and quantitative data in science learning. Reflect on these investigations to plan modifications of current science lessons.

Developing and Using Models

Explore the practice of Developing and Using Models as well as the Crosscutting Concepts of Systems and System Models and Scale, Proportion, and Quantity. Deepen understanding of these two dimensions and participate in engaging science activities. Reflect upon the workshop sample investigations and modify existing science lessons in order to strengthen their support of the NGSS performance expectations.

Evidence-Based Explanations and Argumentation

Focus on two high-leverage Science Practices: Constructing Explanations and Engaging in Argument from Evidence. Conduct investigations that require collecting data and other evidence that will form the foundation for constructing explanations and engaging in evidence-based science argumentation. Based on this learning, modify existing science lessons to be better aligned to the NGSS (NJSLS-S).

Research Simulation Tasks (Grades 6 - 12)

Engage in research simulation tasks that integrate nonfiction text, data sets, videos, and scientific investigations. Develop strategies for supporting student success with these extended writing tasks. You must bring a laptop with WiFi connection capabilities to this workshop.

Integrating the NGSS with Common Core ELA and Math Standards

Explore learning synergies between the NGSS (NJSLS-S), the Common Core ELA (NJSLS-ELA), and Common Core Math Standards (NJSLS-Math). Engage in hands-on, student-centered investigations which illustrate Using Mathematics and Computational Thinking; Engaging in Argument from Evidence; and Obtaining, Evaluating, and Communicating Information. Gain mastery in modifying existing science lessons to emphasize connections between these disciplines.

Problem-Based Learning through the NGSS Engineering Practices

Build capacity to bring the NGSS (NJSLS-S) Engineering Practices into the science classroom. Participate in engineering challenges that use the Engineering Practices to solve real-world problems. Reflect on best practices in student-friendly engineering challenges and subsequently modify units to integrate these practices.

Unpacking the NGSS: Planning 3-Dimensional STEM Lesson Elements

As you implement the new standards, LSC can partner with you to evaluate and adapt your curricular models, lesson design, and pedagogy to capitalize on your current strengths and incorporate NGSS requirements, including the New Jersey and New York science standards. This course can be customized in content emphasis, grade bands (K - 2, 3 - 5, 6 - 8, or 9 - 12) and length (one day or multi-day) to complement your district's needs and schedule.

INQUIRY-BASED LEARNING WORKSHOPS

These workshops have a particular emphasis on educators participating in inquiry-based lessons and activities. Teachers will experience the effectiveness of inquiry as the basis of student learning while learning strategies that will increase inquiry activities in their classrooms.

Inquiry-Based Learning in STEM and Humanities (Grades K - 12)

Deepen your understanding of how inquiry-based learning looks in STEM and humanities classrooms. Dive into sample hands-on inquiry lessons that connect across disciplines. This workshop is co-facilitated by a teacher with expertise in STEM inquiry and a colleague experienced in utilizing inquiry in the humanities.

Investigating Climate Change & Human Impact on Ecosystems (Grades 6 - 12)

Engage in Critical Science and Engineering Practices (e.g., Developing and Using Models,Asking Questions) while building content knowledge to support teaching climate change and human impact on ecosystems. Explore and discuss how to effectively structure inquiry while using science practices to build understanding of the disciplinary core ideas.

Relationships in Ecosystems: Plants, Insects & Birds (Grades 3 - 8)

Model and analyze the relationships that are critical to healthy ecosystems. Discuss and evaluate ecosystem-based lessons that are relevant to student interests and experiences. Weather permitting, participate in brief citizen science activity outside.

It's All in the Question (Grades K - 12)

Effective hands-on science instruction encourages students to make observations, manipulate data, construct explanations, and design solutions. Learn how to stimulate student thinking by helping them ask their own questions, make predictions, plan and carry out investigations, and respond to open-ended questions.

Citizen Science in the Classroom (Grades 3 - 12)

From BioBlitzes to backyard mapping to galaxy discovery, explore how your classroom can benefit from citizen science projects. With a focus on the Science Practices of Analyzing and Interpreting Data and Using Mathematics and Computational Thinking, reflect on how to develop a citizen science project that aligns with NGSS (NJSLS-S), promotes student collaboration, and engages students with solving real-world problems through scientific research.

The Power of Mapping Data (Grades 6 - 12)

Amaze your students with the power of mapping and manipulating data. Investigate online mapping technology Geographic Information Systems (GIS), which promotes visualization and manipulation of spatial data. Infinitely adaptable to exploring different science content areas, online GIS promotes digital literacy and critical thinking skills. With a focus on the Crosscutting Concept of Scale, Proportion, and Quantity and the Science Practices of Asking Questions and Analyzing and Interpreting Data, you will reflect on innovative ways to bring mapping and data analysis to your classroom.

TECHNOLOGY & ENGINEERING WORKSHOPS

These workshops will engage educators in lessons that encourage learners to build their problem-solving skills in the domains of technology and engineering. Teachers will learn effective strategies for increasing their students' technological literacy and engaging more deeply in the NGSS (NJSLS-S) Engineering Practices.

Computational Thinking for STEM Educators (Grades K - 12)

Explore the major competencies in computational thinking (i.e., pattern recognition, decomposition, abstraction, and algorithms), experience hands-on STEM activities that support those domains, and purposefully incorporate computational thinking into existing lessons.

Introduction to Block Coding for STEM Educators (Grades K - 12)

Never coded? Never fear! All levels of experience are welcome. Come program for the first time or expand your skills if you've coded with block-based languages before. Explore the foundations of coding on either Scratch or Code.org, evaluate coding projects, and learn how to integrate offline activities which support computer science and STEM learning. You must bring a laptop with WiFi connection capabilities to this workshop.

Engineering is Elementary (Grades K - 5)

This research-based elementary engineering curriculum has proven engaging and effective in involving students in STEM units that focus on the Engineering Practices. During this workshop, you will explore a sample curriculum unit and be exposed to many other topics that will engage both teachers and students in pursuing proficiency in the NGSS-based Engineering Practices.

Design Thinking for STEM Educators (Grades K - 12)

Learn how to unite science investigations, engineering, and design thinking as you explore how to develop students' creativity, communication, and problem-solving skills. Engage in hands-on design challenges and discuss how to leverage design thinking to support national standards and 21st century skills.

Introduction to 3D Printing for Educators (Grades K - 12)

Explore the power and joy of 3D printing for your classroom! Learn the basics of 3D printing, create your own design in Tinkercad, and discuss different classroom-based examples of 3D printers in education.

GENERAL INFORMATION

Contact Us
201.253.1310 or groups@LSC.org
Weekdays 9:00 am – 5:00 pm
Weekends 9:00 am – 2:00 pm

Group Admission
Special rates are available for groups of 15 or more with advance reservations.

Transportation and Directions
Easily accessible by bus, car, light rail, and ferry.
See LSC.org/visit.

Parking
Convenient, on-site parking is available.
Cars are $7, buses $10.

Health and Safety
We care about your safety and comfort.We have an allergy-aware dining room (reserve in advance), and offer free admission for school nurses. We have an experienced safety and security staff, a building-wide Code Adam protocol for lost children, and a basic first-aid room. LSC is ADA compliant, and located just one mile from a top-ranked hospital.

Lunch Plans
To reserve brown-bag space or order box lunches, call 201.253.1310. You may also purchase lunches individually at Café Skylines, no reservations required.

Accessibility
Liberty Science Center is accessible to all guests. You may request wheelchairs at the Welcome Desk. Assistive listening devices for hearing-impaired guests are available for the theaters and several other public areas.

Special Needs Days
Liberty Science Center tailors days for students with special needs several times a year. Call 201.253.1310 for dates and details.

Science Camp at LSC
This on-site day camp has fun, engaging courses for kids in grades 1 - 8. See lsc.org/camp for dates and more details.

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