



# ANNUAL REPORT 7.16 TO 6.17



## LETTER FROM THE PRESIDENT

The 2016-2017 year was enriching, exciting and heart-warming, thanks to all the terrific mentors, volunteers and sponsors who made our programs possible. Together, our team made it possible for LEARN's kids to:

- **Attend Fun, Hands-On Classes:**
  - **Explore FIRST LEGO League Junior – Creature Craze** – A hands-on intensive for 5 to 9-year-old kids in mechanics, engineering and invention, focused on solving the challenges animals and people face in a shared world.
  - **Explore FIRST LEGO League Robotics – Animal Allies** – A hands-on intensive in robot design, building and programming for 9 to 14-year-old kids.
  - **The FLL Seminars** – A series of seminars for FLL teams and coaches to prepare them for the project, programming and structural engineering aspects of FLL competition.
  - **Sparkle, Buzz & Pop!** – An applied physics and chemistry class for 5 to 9 year olds that introduces kids to science as they conduct experiments and make a variety of projects.
  - **Cityscapes** – An architecture, structural engineering and city-planning class for 9 to 14-year-old kids that challenges them to build a variety of structures and design a city of their own.
  - **The Mini-Bot Build** – Another hands-on intensive in robot building and programming, this time for high school kids.
- **Participate in One-Day Events:**
  - **Engineering Extravaganza** – A fun-filled day of learning disguised as play as kids travel from station-to-station designing their own solutions to our engineering challenges!
  - **City Imagineerium** – A day spent building the kids' City of Their Dreams.
- **Dive deep into STEM in Summer Camps:**
  - **Sparkle, Buzz & Pop!** – An applied physics and chemistry camp for 5- to 9-year-old kids.
  - **Robo Camp – Senior Solutions** – A mini-competition in FIRST LEGO League robotics.



1. A Young Engineer, Testing His Hovercraft

- **CSI-KC: Solving Crimes with Forensic Science** –A camp focused on architecture, structural engineering and city-planning for 9- to 14-year-olds.
- **Go Baby Go! Car Build** – A community service project in which our mentors and high school robotics team designed and built a custom car for a child with spina bifida so that he could explore his world and play with friends on his own.
- **Get a taste of STEM in Community Events** – Maker Faire Library Science Nights and School Science Nights.

In addition, we continued to field robotics teams. Our FIRST Tech Challenge (FTC) robotics team, The Red Hot Techie Peppers finished their seventh season with another bang. They won numerous awards at local and regional events they attended, and they advanced to the MO State Championship where they posted some of the highest scores of the day. While achieving all these things, the team mentored younger kids in LEARN's classes, served as counselors at our summer camps and participated in the Go Baby Go! build.



1. Members of the Techie Peppers, Celebrating Their Win

Every one of these programs was a blazing success thanks to the wonderful kids and the terrific mentors and sponsors who brought smiles to our faces. Read on to learn more about what the kids did!

Thanks for another wonderful year!

Rebecca Kidwell, President  
LEARN Science & Math Club

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## OUR PROGRAMS

LEARN Science & Math Club is a 501(c)3 non-profit. Since 2004, we have been providing kids from the Kansas City metropolitan area with rich science and math experiences through robotics, engineering and programming projects and laboratory experiments. We actively foster the collaboration, organization and communication skills necessary to work and play together.

At LEARN, we know there is a natural scientist inside every kid, and our mission is to foster those native abilities. Whether they plan to become lawyers, chefs or physicists, kids should feel bold and confident in a technical world;

we work hard to make that possible. We use robotics programs such as the FIRST LEGO League and FIRST Tech Challenge as well as invention programs such as the Lemelson-MIT InvenTeam program as learning platforms as well as many home-grown curricula. Below, you will find a summary of our 2015 to 2016 programs.

### FIRST Tech Challenge

In 2010, LEARN Science & Math Club launched a high school robotics program. Our rookie team, The Red Hot Techie Peppers, had a bang up first year – winning the 1<sup>st</sup> Place Connect Award and the 2<sup>nd</sup> Place Inspire Award at the Southeast Missouri State Qualifier and the 1<sup>st</sup> Place Motivate Award at the



2. A Young Inventor with Her Flower Pollinator



3. The Red Hot Techie Peppers

Missouri State Championship. Every year since, the triumphs have continued as the team earned top honors at nearly every tournament they have attended.

If you've not heard of FIRST Robotics, you've missed out on one of the coolest, hands-on learning platforms for building math and science skills. FIRST makes computer science and engineering "hip" by building a sports-like, team-based competition around robotics. Hundreds of thousands of kids from around the world get together and build robots that solve weird, exciting and difficult challenges every year.

### When

The high school team met fifteen to twenty hours per week during the competition season, and they met ten hours per week in the off-season.

### For Whom

Kids do not have to be super-geeks to get involved. If they are interested in business, graphic design, marketing, accounting, computer programming or engineering, we have got something for them! The FIRST Tech Challenge program is for kids 13 to 18 years of age.

### Fall Classes

This fall was filled with fun! LEARN offered three programs for kids from 5 to 14 years of age: Explore FLL Jr.'s Creature Craze, Explore FLL Robotics – Animal Allies, Cyber Safety and The FLL Seminars.

#### Explore FIRST LEGO League Junior's Creature Craze

This fall, it was time go crazy for animals. Whether in zoos, on the farm, or in our own back yards, we all encounter animals in our lives. We will dive into this year's FLL Jr. challenge and learn how our furry, feathered, and finned friends do the amazing things they do. We will dive deep into the physics behind spectacular feats of animal derring do - like how to squirrels glide from tree to tree and frogs climb straight up glass buildings - by meeting with experts, doing fun tech projects and taking some cool



5. A Red Hot Techie Pepper Contemplates The Life of the Pepper



6. Our Creature-Crazy Kids Learn About the Plight of the Honey Bee

field trips. Then, we will turn what we've learned into LEGO models that reflect the ways we can use all that amazing animal tech to make people's lives better.

Over the course of twelve weeks, the kids toured the Kansas City Zoo, learned from the President of the Midwestern Beekeepers Association how they can help save the threatened honey bee, toured the Pet Project to learn about animal shelters, met with representatives from the MO Department of Conservation, and explored the lives of service animals in a class taught by the local assistance dogs association. The kids took a nature walk to learn about the animal habitats in our city, designed and created hand pollinators, made enrichment toys for Zoo animals and created a variety of comfort toys for animals in local shelters.

Next, the kids translated what they learned about the challenges animals face living with or near people into innovative solutions. They designed LEGO models of their proposed solutions – from bee and butterfly gardens, to under-freeway passages for migrating animals and so much more. On the last day, the kids presented their work to family and friends.

### Explore FIRST LEGO League Robotics – Animal Allies

For kids who must look under every hood, push every button and look behind every door, Explore FLL – Trash lit their fire! For twelve weeks, the kids built robots, solved complex puzzles, designed cool contraptions and wrote practical programs.

Better yet, parents didn't have to lift a single calculator, microchip or slide rule. The LEARN team did all the heavy lifting in engineering, science and math – while parents sat back and watched the entertainment.

### The Projects

**Play Team-Building Games** – Solving big challenges requires great teamwork, and we foster these skills through games and a team-oriented approach to all our projects.

- **Learn How to Build Strong** – A lesson in structural engineering
- **Solve Engineering Challenges** – Putting those building lessons to work
- **Design Great Robots** – The kids learned tips and tricks for building a robot that does what it is supposed to do
- **Scope Out the Playing Field** – This is where the kids met soaring success or crushing defeat...not really, competition is all for fun, right?
- **Build Lots of Cool Stuff** – This is where kids got to put their mark on the robot world – adding arms, designing rams, creating the next modern marvel...



4. Young Roboticist Takes Good Care of His 'Bot

- **Navigating Effectively** – The kids wouldn't love their 'bots if they played "dead bug" on the mat; so, we showed them how to get their 'bots to jump tall buildings in a single leap...or, at least, go where they are supposed to go.
- **Take a Class in Programming 101** – A lesson in how to talk "robot"
- **Program Your 'Bots** – Putting that programming lesson to work
- **Put It All Together** - Test all that cool stuff they had been building and make it work.
- **Compete** – This is where the kids found out what their robots were made of! Parents and grandparents joined us to see what the kids had done and celebrate their success.

### What the Kids Learned

In this class, kids learned about structural engineering, strategic planning, software development and robotics. The learning does not stop with STEM education, however. When four or five kids share a robot the size of a bread-box, they learn how to collaborate, communicate and work as a team.

### Cyber Safety

It's a big, wide world out there, and that includes the World Wide Web. Most of the Web is great, but some of it is decidedly unsafe. Given that every kid is going to be on the Web at some time and nearly all of them can hop over the firewalls and other safety nets we put up, it is important that we all learn how to stay safe. So, we have recruited one of the city's foremost Internet security experts to teach us all how to enjoy all the benefits of the Web while avoiding the risk.



8. Kids Learned How to Stay Safe in a Cyber World

### What the Kids, Parents & Teachers Learned

#### The Hazards of the Internet

- Cyber Crime Statistics
- Case Studies
  - How Identity Theft Happens
  - How Cyber Bullying Occurs
  - How a Predator Can Find You
  - How Sharing Info Can Cost You Your Reputation
- How to Protect Yourself
  - Preventing Cyber Bullying
  - Using Social Networks Safely
  - Texting and Chatting Online Safely
  - Being a Good Digital Citizen
  - Protecting Personal Information
  - Avoiding Inappropriate Content

- Sharing Files Securely
- Protecting Your Privacy on:
  - Mobile Phones
  - Facebook And Twitter
- Using Webcams Safely
- Staying Safe in a Multi-Player Gaming Environment
- Staying Safe on Instagram and Snapchat
- Using Public Wi-Fi Access

### The FLL Seminars

LEARN Science & Math Club's FLL teams have taken one or more first place awards at every FLL tournament they have attended. And, they have proudly represented the Western Missouri and Kansas FLL Region at the North American Championship and World Festival on three occasions, bringing home the 1<sup>st</sup> Place Inspiration Award two out of three times.



5. An Introduction to LEGO Mindstorm Programming

And, while we think our kids are the bee's knees, we know that every kid is wonderful. Our kids' success stems from investing a huge amount of time in FLL and developing a rich knowledge base. Not every team has the chance to make such big investments. So, we feel that it's time for us to pay forward the many wonderful experiences we have had in FLL. This year, our kids will not compete. Instead, our teams will host region-wide seminars to share what they have learned.

### What the Kids Learned

- The Research Project – In this session, kids:
  - Received one-stop research – Get the inside scoop on the real-world problems from regional experts on the trash cycle and how to stop it in its tracks.
  - Learned:
    - How to pick a winning topic
    - Choose a presentation format that wows your audience
    - Create a story with all the facts, but plenty of fun
    - How to create their own props
    - And, how to put those artsy types to good use
- Strategy & Structural Engineering – In this session, kids learned how to:
  - Maximize their points
  - Streamline the number of attachments they need
  - Identify “low hanging fruit”
  - Run their missions faster

- Radically improve their handwork
- Build easy-on and easy-off attachments
- Combine missions for optimal performance
- Score high – every time, not just occasionally
- Software Development – And, in the final two sessions of the Seminars, kids discovered how to:
  - Follow lines reliably and quickly
  - Save time and effort by creating reusable code
  - Improve the accuracy of your turns
  - Get better performance with multiple sensors
  - Cut time from your robot runs with code sets
  - Develop advanced programming techniques

### Spring Classes

This year, LEARN hosted three spring classes: Sparkle, Buzz & Pop for younger kids, Cityscapes for middle schoolers, and The Mini-Bot Build for older kids. All three were bang-up successes.

#### Sparkle, Buzz & Pop!

In this class, kids made things sparkle, buzz, fizz, explode, gurgle, ooze, sizzle, froth and pop! Because, of course, who doesn't love to make magic happen? And, while the kids were doing dozens of hands-on projects, they were learning about electricity, circuits, optics, chemical reactions, polymers, thermodynamics, surface tension, hydrodynamics and more!

#### What the Kids Learned

- Sparkling, Buzzing Electricity
  - Electric Playdough
  - Electro-Football
  - Sewn Circuits
- Dazzling Rainbows & Wondrous Optics
  - Exploring Prisms
  - Disappearing Colors
  - Growing Rainbow Crystals
- Fizzing, Exploding Chemical Reactions
  - Color-Shifting Potions
  - Paper Bag Volcanos
  - Frankenworms
- Gurgling, Oozing Liquids
  - Impervious Plastic Bag
  - Milky Muck
  - Bubbling Lava in a Bottle
- Sizzling, Melting Heat
  - Thermochromic Slime
  - Ice Race
  - Magical, Moving Molecules
- Frothing, Floating Bubbles



6. A Designer with Her Amazing Bubble Maker

- Square Bubbles
- Bouncing Bubbles
- Glow-in-the-Dark Bubbles
- Bubble Prints
- And, Other Electrifying, Dazzling, Eye-Popping Projects!

### Cityscapes: A Structural Engineering, Architecture and City Planning Class for Kids from 9 to 13

This class was for kids who:

- Cover every square foot of your house with his or her construction projects
- Refuse to let parents take any of them apart
- And, would rather watch construction crews at work than go to the movies

They LOVED Cityscapes! They built and built and built. Better still, they learned all kinds of hard-core engineering and physics while they were having the time of their lives.

This class took the kids through the entire process of designing and engineering all sorts of structures. They learned about structural engineering, architecture, city planning and transportation planning. Then, we gave them a specific challenge to build in Sim City. Finally, they put all these lessons together by planning out their own city, receiving building permits and “plots of land” and building the city of their dreams – their own City Imagineerium!

#### What the Kids Learned

- **Forces & Motion in Structural Engineering** – That sounds really techie, doesn't it? What it really means is that we'll be studying what makes structures collapse...and how to prevent it.
- **Hands-On Testing** – We'll be checking out loads, compression, tension and the other forces that act on structures.
- **Materials** – Structures are only as good as the stuff they're made of; so, we'll learn about the materials that engineers and architects use, and then you'll test out a variety of materials for building a dog or cat house.
- **Structural Integrity** – Learn what keeps structures standing. Important, right?
- **Strong Footings** – If a structure is going to stand long, it must be anchored to solid ground – which sounds easy, but it isn't. You'll learn just how challenging that is while building your own tower.
- **Bridge- and Tunnel-Building** – Next, you're going to learn a bit about bridges, tunnels and their various designs. Then, you're off to prove you're a master builder by constructing your own weight bearing bridge and ground-supporting tunnels.



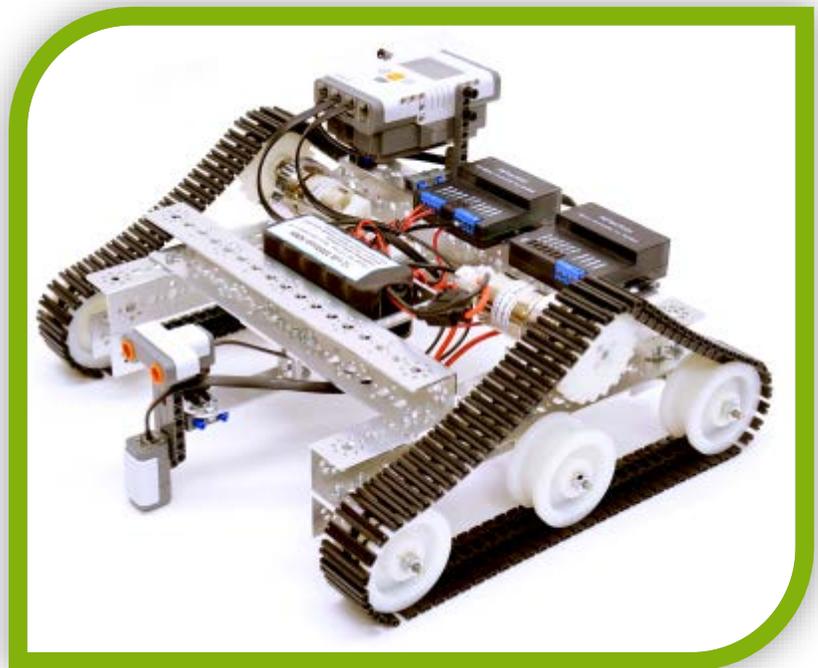
7. A team of young engineers testing their tower's ability to carry a load

- **Architecture and Design** – An introduction to amazing structures
- **Design a Series of Structures** – Put all that new knowledge to work while designing and building a dome to house one of your team mates. Try your hand at other common building forms.
- **Draw Like an Architect** – If you’re going to “boss around” all those engineers and construction workers, you’ve got to have a way to tell them exactly what you want. That’s where drawings come in – learn how to do bubble diagrams, elevation drawings and floor plans
- **Create Your Own Park** – Work with your team to scope out the requirements, design and build a model of your dream park.
- **City Planning** – With the help of city planning experts, you will learn what makes a city a great (or miserable) place in which to live, work and play. Then, you will work in teams to lay out your dream city on paper.
- **Transportation Planning** – Next, we will have transportation experts join us to discuss how you will move around all the “stuff” that cities need to move – commuters, kids on their way to school, groceries on its way to stores, trash on its way to the dump, etc.
- **Design & Build a City in Sim City** – Now, it’s time to put the skills you’ve learned to work. After a quick tutorial on the Sim City software, we will pitch several design challenges like “design a city with great public spaces” at you.
- **Get Your Free Tickets to & Build Your Project at City Imagineerium** – This is where you show off your skills! Whether you choose to build a hotel, a waste treatment facility, an amusement park or one of a thousand other structures, it’s your job to make it the best possible for all the people living in your city. (Parents and grandparents are welcome to come, see what the kids have done and enjoy the show!)

### The Mini-Bot Build

In this class, 13 to 18-year-old kids designed, built and programmed four to six mini-bots to compete in drag races, sumo wrestling, debris collection and other challenges. This class was designed to build rapid prototyping skills in mechanical engineering and programming. Kids built and programmed new robots in just a few hours each week. Then, they put those ‘bots to the test on the field to win prizes and learn a ton. The kids built with the Tetrrix system and programmed in Java.

This class is designed build rapid prototyping skills in mechanical engineering and programming. Build and program your robots in just a few hours and then put them to



12. A mini-bot under construction

the test on the field to win prizes and learn a ton. We will build with the Tetrax system and program in Java.

### LEARN STEM Tastings

Here at LEARN, STEM Tastings are short-term programs that last for just a day or two and are designed to excited and enthuse kids so much that they want to try their hands at more complex projects and programs. Some STEM Tastings repeat every year. Others are one-time events, and the remainder rotate through our program line-up every few years. They all have something in common, though. They are whole lot of fun! Below, you will find a list of this year's events.

### Engineering Extravaganza

Kids from five to fourteen years of age joined us for a fun-filled day of learning disguised as play! Inside every child there was an engineer just waiting to...

- Design the Ultimate Pop Rocket
- Invent and Test Your Own Floating Masterpiece
- Create a Gyroscopic Whirligig
- Build a LEGO City
- Develop a Pencil-Top Eraser Blowgun
- Make a Pecking Bird
- Construct and Shoot a Tri-Clip Bow
- Create and Shoot an Air Vortex Cannon
- Play a Giant Game of Jenga
- And more!

The kids moved from station-to-station building cool things all day long with our fun and wacky technical mentors or settled in and worked on a project for hours. We provided the challenges, the supplies and the engineering guidance; the kids built whatever they could dream. Their imagination is the only limit!



13. A Young Scientist Testing Her Blowgun



14. A Family Young Builders with Their Amazing Tree House, Zipline and Office Building

### City Imagineerium

Saturday, May 6<sup>th</sup>, kids from 5 to 14 years of age gathered to build the most amazing city! Kids from all over town were invited to spend the day building the City of Their Dreams! As kids arrived for this huge event, they “applied” for a building permit, were issued a “plot of land” and mountains of recycled materials. Then, they spent the day building their dream city.

This was the sixth City Imagineerium build. And, we found that kids create the most amazing cities - eco-friendly, beautiful and fun to live in. So, it was no surprise that the volunteer city planners, architects, builders and engineers who were on hand to help the kids say they have learned as much from the kids as the kids have learned from them. This year, as always, the kids just kept on “wow’ing” us! To watch the kids as they built their city, click on [City Imagineerium](#).

### Summer Camps

Weekdays, from June 5<sup>th</sup> thru June 23<sup>rd</sup>, 9a to 4:30p, LEARN Science & Math Club hosted the coolest summer camps! This summer, we hosted four week-long camps.

### Sparkle, Buzz & Pop!

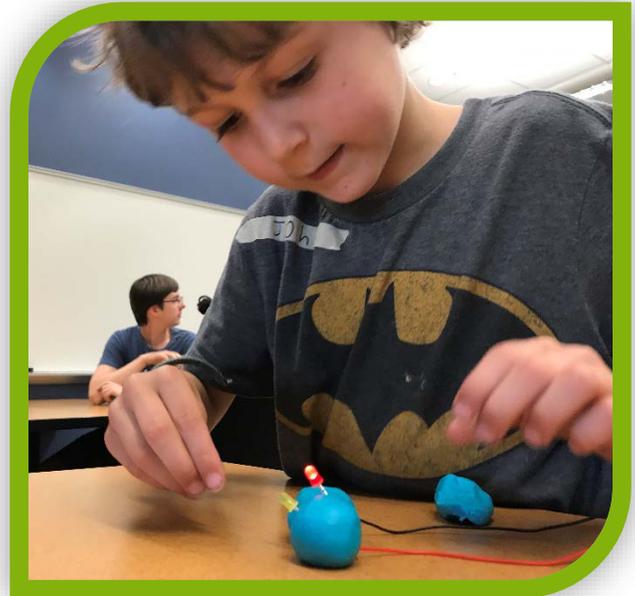
The first camp was a goldmine of sparkling, buzzing and popping experiments in physics, engineering and chemistry. The kids designed, built and tested more than a dozen projects.

### Robo Camp – Senior Solutions

Robo Camp puts all those physics and engineering lessons to work, challenging kids to build LEGO Mindstorm robots that can conquer the world. (Well, maybe not the world - just fourteen tough missions.) This summer, we revisited an old, but good challenge from FIRST LEGO League’s past in which kids were tasked with developing solutions that help senior citizens live longer, healthier lives.

### Cityscapes

For our third camp, our budding builders designed and built all sorts of engineered structures from



15. A Young Maker Tests his Play Dough Circuits



16. Builders Testing Different Materials for Building Animal Shelters

towers, bridges, tunnels, dams, teepees, domes and more. Then, they put all these skills together to create the city of their dreams.

### Community Events

To extend our reach, LEARN Science & Math Club also sponsors activities at many free community events. This year was no exception. We hosted booths with lots of fun, hands-on projects at a variety of events. These included KC Maker Faire and school Science Nights.

### Community Service Program – Go Baby Go Car Build

In the spring of 2017, LEARN’s Board, tech mentors and high school robotics team – The Red Hot Techie Peppers – built a car for Colson. Colson was two and a half years old when we met him for the first time; he is a charming, sunny little boy who wanted desperately to play outside with his three brothers and neighborhood friends. Because he was born with spina bifida, he cannot walk, and because of his age, his insurance will not provide him with a motorized wheelchair. So, he could only sit and watch the other kids play. We knew we could help!

We conducted a needs/wants analysis with Colson and his family, and we collected biometric data. We learned that Colson needed:

- Hand-controlled power – Colson needed a hand-controlled power switch on the perimeter of steering wheel or squeeze triggers to allow him to control his speed with his hands rather than his feet. We added a small button under his right thumb on the steering wheel that delivers power when pressed.
- A lighter-touch steering wheel – Most electric, toy cars’ wheels are just too stiff for Colson to easily turn; we adjusted the steering wheel’s motion to make it move more smoothly.
- Wider/larger steering wheel – This car came with a steering wheel that has a wider-turning radius to make steering easier for Colson.
- Full harness that to keep Colson safe and upright – We created a harness that goes around both shoulders, around waist and between Colson’s his legs (like those on a stroller) to keep him upright.
- Seat with high-back and wing-support – Colson not only needed good support to help him keep his back against the seat (since he can’t plant his feet to hold himself upright). He also needed side-to-side support to prevent him from slipping sideways.



17. Colson Enjoying His “Hot Rod”

- Adjustable seat – We built the seat so that it could be moved backward as Colson grows.
- Lots of padding to protect his back from the plastic seat – Colson has a tender, protruding place in his lower back that might pain him if it were pressing against a hard surface like a plastic seat; so, we created a web-backed, foam-padded seat with a removable, washable cover.
- Good all-terrain wheels and off-road capabilities so that Colson could drive around his yard. This car already had good balance and large wheels. We added a rubber surface to the wheels to give them good grip.
- Kill and throttle switches – We mounted these high and within easy reach of Mom and Dad so that they can override the car’s controls in case of an emergency.
- A car with low sides – This car’s low sides may allow Colson to pull himself up on the sides of the car and pull himself into the seat as he grows.
- Longer battery life – The batteries that come standard with these cars have a very short run time, a short lifespan and a long recharge period. We purchased two, longer-life batteries; this allows Colson to drive for up to two hours on the first battery while the other charges.
- Rear-view mirrors – To allow Colson to move in reverse safely.

We also wanted to provide Colson with a two-seat car so that he could drive about with his brothers and friends. Even better, a two-seater would put Colson in charge for a change. After considerable research, we chose the Power Wheels Dune Racer by Fisher-Price. It met all our criteria; plus, it can carry loads up to 130 pounds. This would allow Colson to drive his car for many years.

Modifying the car for Colson was a blast! We rebuilt the car to meet all his needs, and we tricked it out with red, LED glow lights, rear-view mirrors and a head cushion with his name on it. We wanted Colson to be the envy of his neighborhood! And, now, he is. His friends vie to be a passenger in Colson’s “buggy.”

And, Colson was not the only one to benefit from this project. Our high school team – though they have built dozens of world-class robots – said, “Building something that really changes someone else’s life is one of the coolest thing we have ever done.” Our mentors and Board loved the project for the same reason. We felt so lucky to have a chance to work on this project, and we think you will too!

## THE RESULTS

At LEARN Science & Math Club, we operate on the assumption that kids can do extraordinary things. And, they always prove us right! Our kids:

### Build Teams and Communicate Effectively

Our programs teach kids to:

- Work closely with other kids to analyze and solve complex, on-going challenges
- Treat others with respect, kindness and appreciation for the skills and abilities they bring to the project
- Research a topic, identify opportunities and present new ideas to professionals, government officials and the community

### Build Life Skills

Our kids:

- **Develop Strong Technology Skills** – Not all our kids want to be engineers; some want to be doctors, programmers or lawyers. All of them, however, know they benefit from being able to put technology to use. They learn sound engineering principles, strong computer, project management, mechanical and electrical engineering skills.
- **Build Business Skills** – Building and programming robots is cool, but solving real-world problems is even better. So, our team does more than compete in FIRST robotics challenges. They are launching a technology-related business. We bring in marketing, sales and accounting professionals to help them commercialize concepts like:
- **Created Script Alert** – One of our FLL teams proposed an innovative, Web-based product to prevent millions of injuries and deaths related to prescription drug dosing errors. Several members of that team moved up to our new high school team, and they won the Lemelson-MIT InvenTeam grant to fund the prototyping of this product.



18. Our Rock'n Robo Rabbits FLL Team with Friends at The North American Championship in San Diego, CA

## Make a Difference

Our kids have:

- Worked to reduce energy usage and pollution. They:
  - Developed a Web application that encourages people to carpool by helping them to easily catch a ride with their Facebook and My Space friends
  - Presented a proposal to the KC City Council and the Missouri State Legislature, encouraging them to implement a metro-area wide ride- and bike-sharing project
  - Built emissions-free pedal cars and displayed them at the Nelson-Atkins Museum of Art and the KC Zoo on Earth Day to demonstrate it's possible to get around town without polluting
  - Conducted a flash mob event called, "FREEZE to Save the Planet," to promote awareness of the many small things we can all do to reduce energy usage and pollution. To see a video of this event, visit [FREEZE](#).
- Created a patented biomedical engineering product called Script Alert that could save thousands of lives each year
  - Developed two food safety product concepts:
    - One, called Food Tracker, uses RFID technology to trace foods from farm to fork, ensuring the CDC and other experts can quickly track and stop food poisoning and contamination.
    - The other, called Stick EZ, uses existing immunoassay technology in the form of a small sticker to identify foods that are contaminated with food poisoning or pesticides.
  - Host Open Houses and Science Fairs
- Mentored Our FLL And Jr.FLL Teams – Most of our high school team members volunteer four to ten hours a week year-round to coach the younger kids in our program. This year, they led these teams to three 1st place awards.
- Hosted Summer Camps and STEM Classes – LEARN hosts three to five week-long science and math enrichment programs each year. Team members volunteer as camp counselors. These camps serve as both community outreach and a principal fundraiser for the team. Our high school team also assists with a variety of STEM classes including Circuit Board Design & Production, AutoCAD Inventor, the Mini-Bot Build and Programming in Robot-C. They also help us put on several free community service events such as Science Nights at the Kansas City Public Library and projects at the Kansas City Maker Faire.



19. Our Shadow Knights FLL Team Presenting Sticky EZ

## Achieve Big Things

Our younger teams:

- Took 1st Place awards in local and Regional competitions every year (and they've often taken home more than one award)
- Won 1st Place for the Chairman's Award – the top honor – their last two years in FLL
- Represented the Western Missouri and Kansas Region at North American Championship and at World Festival – making them one of the top 79 teams out of over 22,000 teams for the last two years. On both occasions, they finished in the top ten teams, earning the 1st Place Award for Inspiration.
- Been nominated twice and won an International Core Values Award for being one of a handful of teams from around the world that best demonstrates gracious professionalism, kindness and support for other teams

Our high school teams:

- Score High – Six years ago, our rookie FTC team won the 1st place Motivate award, the 2nd place Inspire award and was nominated for the Connect award at the Southeast Missouri State Qualifier. They went on to earn the 1st Place Motivate Award at the 2012 State Championship. Since then, they have won numerous awards every season, advanced to the Missouri State Championship every year and won numerous awards there.
- Designed Exhibits for Science City – For their City Imagineerium proposal, the team won a \$2,500 grant in the Burns & McDonnell's Battle of the Brains
- Developed Life-Saving Product – They won one of only fifteen MIT InvenTeam grants that were issued worldwide in 2012. Over the course of the school year, they developed a working prototype of their product, Script Alert. This biomedical engineering device tracks, guides and reports on patients' prescription medication. It has the potential to save hundreds of thousands of lives each year and was hailed as the most commercially viable and life-saving product at the Lemelson-MIT Eureka Fest in June 2013.
- Earned Money & Win College Scholarships – The team has two financial goals – to earn all the money they need to fund their robotics program and to help kids invest in their future. They earn a stipend for their outreach and community service work as well as qualify for FIRST scholarships.



20. One of the Pepper Drive Teams Guiding their Robot to Success

## OUR TEAM

LEARN Science & Math Club is an all-volunteer organization. We owe huge thanks to our wonderful Board members, mentors, coaches and teachers for their tireless devotion to making so many opportunities possible for kids from all over the Kansas City metropolitan area and around the world. Many of our team members work twenty to forty hours per week at LEARN after putting in full days at their “real” jobs.

### Our Board

We have a strong and diverse Board that provides guidance and unflagging support for our programs. Our Board includes:

- President – Rebecca Kidwell
- Vice President, Technology – David Sherrick
- Vice President, Security – Jeff Stice-Hall
- Secretary – Amanda Madrigal

### Our Volunteers

LEARN simply could not function without the many people who give their time to helping kids. For some of our larger events, we have as many as fifty volunteers devoted to helping, encouraging and keeping kids safe. This is equally true of our on-going programs. Week after week, dozens of parents and professionals band together to mentor and guide our kids.



21. Volunteers from Henderson Engineers

## OUR DONORS

LEARN’s donors bring joy, opportunity and a life-long love of science and math to kids throughout our community. With immense gratitude, we thank all our donors for making our work possible. Some of you are individuals, and others are large organizations. Whatever the size, your contributions are invaluable. You made so many children happy this year.

Below, you will find a list of our corporate sponsors. Many, many individuals generously contributed to our kids’ success as well. With concern for their privacy, we have not listed our individual donors by name.

### \$10,000 or More

- Rockhurst University

### \$1,000 to \$10,000

- Black & Veatch

- Saint Pius X Church
- Synthesis Solutions, Inc.
- The United Way
- UMKC's School of Computing & Engineering

### \$500 to \$1,000

- FIRST
- Garmin

### HOW TO HELP

As we all know, success is expensive. Parents and kids continue to ask LEARN Science & Math Club for more – more classes, more camps, more events, more advice. While this is a wonderful situation to be in, it comes at a cost.

Over the last thirteen years, LEARN has grown significantly each year. Demand has outstripped our resources. We need to buy more computers, robots and other STEM equipment

to meet the need. We also need dedicated meeting space to offer more programs, more often. And, we've done all this with no paid staff. Everyone involved has volunteered their time; some Board members have routinely volunteered 20 to 40 hours per week for thirteen years.

To continue to grow, we will need to eventually offer some form of compensation to those who are giving full-time service. In addition, we would like to offer scholarships for those kids who can't afford LEARN's very modest fees. Currently, fees are set at or below direct costs; consequently, we cannot easily afford to waive fees, but many families have asked for help. Presently, when we waive fees, a Board member will step in and pay the child's costs. We would like to be able to do more.

We also need to find a permanent home. LEARN always needs computers, supplies, accounting, marketing, legal and printing services. To meet these objectives, we will need to raise over \$100,000. And, our kids always need mentors. So, there are many ways you can contribute. Get involved and make a lasting difference in kids' lives.



22. A Master Engineer Studying Structural Dynamics (While Playing Giant Jenga)

## OUR BUDGET

For its first two years, LEARN Science & Math Club was funded largely by Kauffman Foundation grants and private donations. Since then, program income has brought in a significant share of our budget. We are deeply grateful to our sponsors, donors and grantors who providing the remaining funds and make it possible for us to buy supplies and equipment for our programs.

	2016-2017 Actual	2017-2018 Projected
<b>Income</b>		
Contributions and Support	\$63,906	\$45,000
Earned Revenues	\$0	\$0
Fund-Raisers	\$0	\$0
Services	\$34,128	\$45,000
<b>Total Income</b>	<b>\$98,034</b>	<b>\$90,000</b>
<b>Expenses</b>		
Advertising	\$208	\$250
Bank Charges	\$0	\$0
Contractor Expenses	\$0	\$0
Insurance - Corporate	\$0	\$750
Legal Fees	\$0	\$0
Office/Gen. Admin. Expenses	\$404	\$450
Payroll Expenses	\$0	\$0
Postage and Delivery	\$0	\$0
Printing and Reproduction	\$0	\$0
Professional Services Fees	\$970	\$1,500
Salaries and Related Expenses	\$0	\$0
Rent	\$0	\$5,000
Program Costs	\$49,612	\$50,000
Taxes	\$0	\$0
Telephone	\$0	\$0
Travel	\$0	\$0
Refund Expenses	\$0	\$0
Utilities	\$0	\$0
Web Development and Maintenance	\$0	\$0
<b>Total Expenses</b>	<b>\$51,193</b>	<b>\$57,950</b>
<b>Net Profit/Loss - Cash Only</b>	<b>\$7,640</b>	<b>\$4,500</b>
<b>Net Profit/Loss - Total</b>	<b>\$46,840</b>	<b>\$32,050</b>

## Income

From 2004 to 2014, LEARN Science & Math Club grew substantially each year. For the last three years, LEARN Science & Math Club's income was similar to the previous year. This stasis is due to lack of resources. Demand exceeds our physical capacity. We need more space, more instructors and more supplies to host more classes, camps and events. Our current partners cannot lend us any more space, provide more time or funds; their resources are tapped out. We need to find new partners or new sources of income to pay for this space.

## Contributions and Support

The largest share of our income came from was contributions, contributed largely by Rockhurst University, Black & Veatch, St. Pius X Church, Synthesis Solutions, Inc., The United Way and UMKC's School of Computing & Engineering.

## Expenses

Through its history, LEARN's expenses have been largely those needed to deliver its services to the community. We have had incredibly low administrative expenses, and this year was no exception.

Our largest expense categories this year were those that represent LEARN's Cost of Goods which are the funds spent to serve our kids. The expense categories included in COG are Supplies & Materials for classes, camps, competitive robotics and STEM tastings. Combined, these categories represent 97 percent of LEARN's expenses. This year, LEARN earned a small profit which it retained to fund the launch of the next school year's programs.

Administrative expenses included, in order of cost, professional services, office and administrative costs and advertising and promotion. Together, these expenses amounted to 3% of our total expenses. This administrative to production expenses ratio is so low because LEARN has operated as an all-volunteer organization throughout its history and channels nearly every dollar into services for kids.

## 2017 to 2018 Projected Budget

We have projected an 8% decrease in income for next fiscal year because we did a flurry of last-minute fundraising this year to get our high school robotics team to the World Championship. This is a rare event (less than one percent of the FIRST Tech Challenge teams get to go each year). So, though we



23. Our Campers Exploring the Amazing Properties of Polymers (Otherwise Known as Slime)

wish our kids the very best, we do not expect they will need us to raise as much money this year or every year.

We have projected an increase in expenses. These increases occur in the following categories, in order of cost: rent, insurance and professional fees. We expect to have to pay rent for the first time to house our high school robotics program; St. Pius X Church has very generously provided our team space for free for the last four years. This has been a great blessing, making it possible for our kids to design and build robots, work on community service projects and – most importantly – to learn and grow.

Unfortunately, the boiler has failed in our wing of the building, freezing pipes and causing terrible property damage. The church cannot afford to repair the building; so, they are going to tear it down. We have been searching for a new space for months without success. We believe will have to pay rent to continue the program; a modest estimate for this is included in next year's budget. Insurance and professional fees will not actually increase. We simply pre-paid some or all those costs last year; so, they did not appear in this year's Profit and Loss Statement. They will return to our Statement next year.