# 2020 - 2021 FIRST LEGO League Annual Report



VIRGINIA + WASHINGTON, D.C.



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WASHINGTON, D.C.





# Rebranding

FIRST Rebranded the "LEGO" programs to incorporate a wider audience and expand upon the pre-existing programs. All programs are now under the "FIRST LEGO League" umbrella and has since added branches of the program.



# Rebranding: FIRST LEGO League Discover



#### What have teams been doing?

Teams of children ages 4-6 have been given meaningful problems to solve linked to a relevant real-world theme. They have designed and built solutions, learning how to work together to develop their ideas. Using LEGO Education STEAM Park sets, they have iterated on their DUPLO® constructions and shared their achievements with others.

#### We are celebrating the teams' hard work!

#### **Reviewing:**

As children are working, the reviewers will talk with them about what and how they are building. The teams will explain their designs and the work in their Engineering Notebooks.

#### **Special Challenge:**

Different teams will be matched with each other to solve a special challenge to design and build a new part that will join their models together

#### **Celebration:**

The event will end in an award ceremony where each child is celebrated for their amazing achievements. Confidence is boosted as the children receive recognition for their hard work.



#### **Building:**

Teams will work together to build a (team) model that showcases all they have learned about the real-world problem they investigated.



# Rebranding: FIRST LEGO League Explore



#### What have teams been doing?

Teams of children ages 6-10 have investigated a challenge related to a real-world theme, designing and building their solution as a group. Using LEGO Education WeDo 2.0 they have learned to code their team model to move and be interactive using sensors

#### FIRST ® LEGO® League Explore makes learning STEM and coding skills fun!

#### **Reviewing:**

The reviewers will visit each team to listen and ask questions about the models they have built and coded. The children will explain how their code makes their models move and talk about what they have learned about working as a team.

#### **Special Activities:**

Children will take part in different STEMrelated activities and have the chance to work with each other to solve new problems.

#### **Team Model and Team Poster:**

Teams will showcase their work to everyone present by explaining all they have learned about the realworld problem they have investigated.



#### **Celebration:**

The event will end in an award ceremony where each child is celebrated for their amazing achievements. Confidence is boosted as the children receive recognition for their hard work

# Rebranding: FIRST LEGO League Challenge



#### What have teams been doing?

For roughly 12 weeks, teams of students ages 9-16\* have engaged in research, problem-solving, coding, and engineering – building and programming a LEGO® Education SPIKE<sup>™</sup> Prime or LEGO MINDSTORMS® robot and conducting a research project to identify and solve a relevant real-world problem related to the annual theme.

#### FIRST ® LEGO® League Challenge makes STEM inspiring and fun

#### Judging:

Teams will share what they have learned and get valuable feedback on their Robot Design, Core Values and Innovation Project in a halfhour judging session. Judges will assess their work on rubrics and provide some immediate verbal feedback to encourage and inspire them.

#### **Robot Game:**

In addition to judging, each team will play three separate 2.5-minute matches of the Robot Game.





They will try to have their robot score as many points as possible by solving the missions of the RePLAYSM game. Only their highest score counts.

The Robot Game allows teams to demonstrate how well their design and code worked. In between matches, you may see them working together to iterate and improve their robot for their next round.

The Robot Game will also showcase how the teams embody Gracious Professionalism® -- the spirit of friendly competition unique to all FIRST programs.

When all the matches and judging sessions are complete, the topperforming teams will take home awards, but all teams will share in the celebration of a season well done.

# FIRST LEGO League Challenge 2020 - 2021 Sponsors

Thanks to our 2020 - 2021 sponsors, we continue to have the opportunity to provide a *FIRST* LEGO League Season to Washington D.C and Virginia teams. This includes (in a normal season) 20+ Tournaments, 1 Championship and 10+ Festivals (previously known as "Expos"). Additionally, sponsors like you go above and beyond by filling our needs by providing spaces to host events, team grants, volunteers and so much more.

Every year, *FIRST* LEGO League community comes together for a common goal, to provide STEM education to anyone and everyone who is interested. This year, we were humbled by the togetherness of this community. They knew the hardships that teams were facing whether it was social, economical or just learning the new "norm". The community rallied together and provided a year of tournaments that will never be forgotten. It is thanks to the monetary and in kind support that we were able to continue our journey and become innovative in our method of delivery.

As you can imagine, the 2020 - 2021 season was one like no other. The motto within the core planning committee quickly became "PIVOT". With the ever changing protocols for COVID we worked diligently to ensure the safety of our teams and volunteers. In the end, we achieved something we never thought was unattainable. We turned the *FIRST* LEGO League Challenge season 100% virtual. Teams were excited to have something to look forward to in a time of uncertainty and further instilled the sense of community that was pre-exisiting.



#### **Brick Sponsors**



#### **Team Sponsors**



#### **In Kind Sponsors**





### VIRGINIA + WASHINGTON, D.C.

### **Team Impact**



49% of teams registered with *FIRST* competed in a local competition



Teams registered with VA-DC FIRST LEGO League competed in a local competition



During the 2020/2021 season, the tournaments were unlike any other. VA-DC FIRST LEGO League overcame the challenges of the pandemic and successfully conducted 8 qualifying tournaments and 1 championship event. With the dedicated assistance of wonderful volunteers we were able to a move the tournaments to a 100% remote platform.

Due to the dedication of the volunteers and teams to provide some normalcy in the midst of the chaos, 120 teams competed in a local competition and 64 went on to the championship event.

Some teams took it a step farther and decided to submit their innovative solutions to the challenge for a chance to compete against 21 teams globally. Winners receive \$20k to further advance their project and an opportunity to patent their invention.

## **Season Schedule**

### Season Schedule

#### January 2020 - February 2020

- Volunteer training
  - Volunteers were trained on the updated platform and the procedures of the tournament
- Teams worked to submit robot practice rounds to referees for review
- Teams submitted materials needed for tournament
  - 3 robot rounds, innovative project information, robot design notebooks & anything they deemed necessary to successfully compete in their tournament



#### Day of Tournament

- 8:30am Virtual Coaches Meeting
- 9:00am Virtual Opening Ceremony

#### <u>10:00am</u> - <u>3:00pm:</u>

• Teams met with judges throughout the day at their designated time to submitted materials and project

#### <u>10:00am</u> - <u>4:00pm</u>

• Referees worked together to score robot rounds throughout the day as well as answer questions

#### 4:30 - Closing Ceremony

### **Event Logistics**

To successfully conduct a tournament that is designed to create an environment of camaraderie, instill *FIRST* core values and create a sense of community was no easy task. However, VA-DC *FIRST* LEGO League strived to create a season as "normal" as possible. In doing so, the community stood strong and the *FIRST* core values were demonstrated at an elevated level. Coaches and mentors came together and teams were elated to have something to look forward to.

Like so many other organizations, Zoom became the primary source of communication and a primary tool to successfully conduct a *FIRST* LEGO League season. In order to do this, **316** "Zoom rooms" were created. These rooms were used for various purposes: rooms for judging for teams, judges to communicate, referees scoring robot rounds, teams to enter if they had questions, ALL judges to get together and ALL referees to get together.

#### **Tournament Schedule**

Jan. 23rd - Qualifier 1 Jan. 30th - Qualifier 2 & 3 Feb. 6th - Qualifier 4, 5 & 6 Feb. 7th - Qualifier 7 & 8 Feb. 27th & 28th - Championship Event



Prior to the tournament day, teams were able to submit a practice round of their robot to ensure the angle was effective, that their table was set up correctly and the referees could address any errors ahead of their tournament date. Teams were required to then submit 3, 2 minute 30 second videos demonstrating their robots abilities and accomplishments. As you can imagine, having 119 teams submitting multiple videos, there were tons of videos to be watched - a total of 620 videos to be exact. On the day of the tournament, referees watched the recorded content together to score each robot round.

A tournament is not complete without allowing teams to show off their innovative project, core values and talk about their robot design and reasoning behind it. The judging sessions took place the same day as the tournament. Teams were given 30 minutes with 3 judges to demonstrate all they worked on throughout the tournament season.

### **Event Statistics**



For the remote event platform, Zoom rooms were created, teams had prerecorded robot rounds, and judging sessions took place on the day of the competition. There were a total of 8 qualifying events and 1 championship event.

### **Volunteer Impact**

"What [the community] pulled off this season was nothing short of miraculous. I know that in a year of constant disappointments, having a virtual competition for the FLL students meant the world to them."

"I thought everything was amazingly organized! I was really impressed with how wonderful the tournament was in the middle of COVID. Great job to the VA-DC FLL team and everyone else who helped make this happen! Really, really impressed!"



"Yesterday went SO well thanks to y'all. I was a bit trepidatious, of course, until we really got going, but the judging end seemed way smoother than usual, especially the deliberations! Thank you for all the hard work you do for this—I know we don't even see the whole TIP of the iceberg."

"Nice tournament today! Well done. Thank you for keeping this going even when times got tough. I know it means so much to the teams and volunteers who have been with this program for so long."

# **Hear From Local Teams**



#### Due to COVID, how did your team meet?

100% zoom all season! We learned to use breakout rooms, group texts, FaceTime, Microsoft Teams, and any other technology source that we could to communicate ideas and collaborate with one another. It was certainly a challenge, but one that we accepted with excitement and motivation!

### What part of the challenge did you enjoy the most? Why?

Our favorite part of robotics are the core values. While all of the components are fun and challenging, we feel that none of those other categories would be possible without displaying each of the core values throughout the season. Absolute Zero is a family and that comes first over everything else! We live by those core values and use them as we prepare for the other parts of the challenge.

### What is something your team was proud of this season?

Absolute Zero won the Champion's Award for Division 2 at the VA/DC state championship!!!! Although this season was extremely difficult and we were 100% virtual the entire season, we overcame all obstacles, learned new skills, and beat the odds!!! We have never scored high on robot game. We decided to use Spike Prime (which was brand new to us) and once we learned how to use it, it paid off. With lots of perseverance and collaboration through zoom, we were able to place 3rd at state for robot game! We also received the nomination for Global Innovations! We are so proud of our accomplishments this year!

### What did you miss most about in person events?

Being with people, meeting new people, chanting and cheering for other teams, camaraderie, the overall excitement and fun, and rolling down the hill!

### What did you enjoy about the remote event platform?

Having the opportunity to see other teams projects, virtual pits, robot runs, and the opportunity to chat. Even though in person is much more personable, we were able to really take time to look at other teams projects and information that they shared and that was neat to see.

### What was your favorite part of the Replay season?

We really enjoyed the robot game this year! The missions were fun to work with and it was exciting to find innovative ways to accomplish them using Spike Prime for the first time! We really felt a sense of pride with our robot performance this season.

Highest Scoring Robot Round

425

# **Hear From Local Teams**



#### Due to COVID, how did your team meet?

Bob's Bricks usually met in person once a week and via zoom once a week, but went fully virtual when members had to quarantine or family members had to quarantine. They were really good about working independently outside of meetings as well.

### What did you miss most about in person events?

Seeing the teams interact and the excitement of live robot runs.

### What is something your team was proud of this season?

Bob's Bricks made great improvements in robot design/performance this year, but as coaches we were most proud that despite losing team members due to COVID, they worked incredibly well together and each carried a bigger load than in previous seasons.

### What part of the challenge did you enjoy the most? Why?

Bob's Bricks enjoyed Robot Design the most because they liked testing new parts, making new attachments, etc.

#### What was your favorite part of the Replay season?

Bob's Bricks' favorite part of the season was building a new robot from scratch and programming it on a new board. They were particularly excited to use new wheels they didn't have before.

### What did you enjoy about the remote event platform?

It really made for a lower stress day for parents and the team

Highest Scoring Robot Round

395

# **Hear From Local Teams**

### What was your favorite part of the Replay season?

- Our weekly silly songs: Hot Rod Lincoln, Hound Dog, and the Purple PEOPLE Eater!
- When our names were announced as State competition winners!

### What part of the challenge did you enjoy the most? Why?

Our favorite mission was Big Boccia. It took precise alignment, scored us 105 points, and took hard work , patience and teamwork; it worked most of the time!

### What is something your team was proud of this season?

1. Worked so hard to get golden run, added 35 pts. after regional

2. Our app advertisement - and a jingle which were both fun and interactive

3. State competition judge remarked that he had zero questions after our project presentation

4. Our quick thinking and teamwork skills at the state competition robot presentation; nearly ran out of time!

5. We went beyond FLL and participated in other STEM competitions like MIT App Inventor App of the Month, and the Virginia Tech Global STEM Expo, and Computer Science Girls

#### 6. WE WON THE STATE CHAMPIONSHIP!!!!

#### Due to COVID, how did your team meet?

- 3 girls at a time with masks inside the house for the robot missions, sometimes outside on a warm day. With the other two girls at home and participating from google meet we were able to work on the project and core values.
- Online 2 days a week
- In person 1 time a week.



### What did you enjoy about the remote event platform?

- Could perform on our own robot board, so we didn't have to worry about different changes that could affect our run
- Judging format every presentation in 25 minutes was easy, simple and efficient
- All judges could see all our achievements in the season, in one place - We had more time to prepare, engage, and learn because the competitions were delayed

### What did you miss most about in person events?

- The energy and air of competition -Meeting new teams and making new friends
- The thrill of meeting and communicating with judges, and new people
- The giveaway booths, and the fun with all the teams
- Traveling to the State tournament and swimming in the hotel pool! :)



415

## **Global Innovation**

Science, technology, engineering and math (STEM) has always been the catalyst for innovation that moves our world forward. As we imagine and discover future technologies and industries, we can prepare today's youth to become the future leaders and innovators.

During the 2020-2021 *FIRST*® GAME CHANGERS powered by Star Wars: Force for Change season, *FIRST* offered challenges for all *FIRST* programs that immersed students with hands-on innovation learning, provided all participants the opportunity to further develop their confidence and skills in observing problems and opportunities, business and marketing development, understanding and using research findings, efficient design, factors for implementation, strategic and design thinking, and the entrepreneurship and innovation process.

Advancing *FIRST*® LEGO® League, *FIRST*® Tech Challenge, and *FIRST*® Robotics Competition teams will showcase and celebrate their innovative solutions at the 2021 *FIRST* Global Innovation Awards powered by Star Wars: Force for Change held June 28-30 as a remote event in front of *FIRST* Strategic Partners and a global audience of peers and industry leaders.

Virginia and D.C. was allotted 4 nominations for the Global Innovation Competition in the 2020/2021 season Replay Challenge.

Season Replay encouraged students in grades 4-8 to step into the world of sports and develop new, innovative ways to encourage others to play and be active. Participants built and coded their LEGO® MINDSTORMS® Education EV3 or LEGO® Education SPIKE<sup>™</sup> Prime to perform play and fitness-themed missions in the RePLAY Robot Game. The missions reflect potential thought-starters for their self-directed Innovation Project, where students will identify a problem related to people not being active enough, research the problem and design a new piece of technology or improve an existing one to help them solve that problem.





The Virginia/DC nominees were placed up against teams worldwide for a chance compete with the top 20 innovative projects worldwide. The winner of the Global Innovation Award will receive \$20k to further advance their innovative solution and further guidance on how to patent their invention.

### **Global Innovation** Excalibots



#### Team Excalibots

Excalibots developed a unique solution to the lack of motivation for adults to get exercise on a daily basis. What they discovered is that there are 3 components to why we make excuses not to exercise.

1. Lack of Motivation

- 2. Time
- 3. Access to Fitness Equipment

Exaclibots developed "The Sit-Fit" to provide easy access to fitness equipment. With 45 parks and 206 bus stops in Loundon County, their goal is to have this device at every location putting the total number of "The Sit-Fit's" in 251 locations in Loudon County alone.

The total cost of each "Sit-Fit" is **\$221.96**. To implement this invention in all **251** locations, this brings the total cost to **\$55,711.96**.

What is unique about the "Sit-Fit" is that it is easily accessible to any Loudon County, or surrounding area residents that utilize the 45 parks, or 206 bus stops at no cost. Users of the "Sti-Fit" will want to receive a card - at no cost - from their local grocery story, town hall or gas station to begin using the device. Once a card is obtained, users will have a unique user ID to begin their workout session.

The card is linked to the users progress and also provides additional motivation to receive "points" in the process. These points can be redeemed at local grocery stores and other surrounding stores to keep young and old motivated to exercise. Additionally, the highest score of the day is displayed on the "Sit-Fit" to create a friendly competition and playful environment among users.

# Interested in hearing directly from the team?

Check out their presentation!





### **Global Innovation** FierceFoxes

Team Fierce Foxes identified a problem that most children are spending too much time using electronic devices (tablets, gaming consoles, phones, etc.). Too much time in front of a screen can result in obesity, susceptibility to chronic health conditions an computer vision syndrome. Computer vision syndrome results in strained eyes, dry eyes, blurred vision and headaches. Additionally, there is potential for heart disease and/or diabetes.

Psychological conditions include impaired social skills, weakened emotional judgement and delayed learning in young children.

Team Fierce Foxes took exercise to a different direction by incorporating technology into their exercise routines using an accelerometer within different narratives users to follow along with. Users will find conflicts along the way and there are certain movements you will have to complete in order to move to the next phase in the narrative.



#### **Team Fierce Foxes**

One narrative in set up in a garden with attacking gnomes. In order to escape the danger of the attacking gnomes, the participant will need to do 15 butt kicks and jog in place to escape. Once that task has been completed you go on to the next scenario and perform the correct tasks to advance further. That is one way to use team Fierce Foxes app to get exercise and be entertained all at once.

# Interested in hearing directly from the team?

Check out their presentation!





### **Global Innovation** Coding Masterminds

#### Team Coding Masterminds



Coding Masterminds identified a longtime problem of expensive bulky exercise equipment. They wanted to create a solution that was both cost effective and compact. They discovered that while healthy eating has increased during the pandemic, getting active was still an issue and the team wanted to provided a low cost and space saving solution

#### Introducing the SteppeX!

Coding Masterminds redefined the stair stepper by creating SteppeX. SteppeX

Coding Masterminds went through numerous iterations before landing on a prototype that worked for them. With foam, 2x4s, fiberglass and step counter they were able to create a successful prototype.

Their long term goal is to eventually create a final prototype with a larger screen for step counting and more durable materials.

# Interested in hearing directly from the team?

Check out their presentation!





# **Team Demographic**

#### Gender



Males in the Program

VA-DC FIRST LEGO League continually strives to create an inclusive environment for any race, gender or nationality within the Virginia and D.C. region.

One particular goal the organization set out to achieve was to increase the number of females in the program. With the American national average of 26.7% of women in STEM in the workforce, we are proud to say, we have surpassed the <u>national average for 2020</u>.

#### **Nationalities**

With team grants provided by Amazon Future Engineers, Shenandoah Valley Technical Council, Rockwell Automation, Booz Allen Hamilton and Newport News Shipbuilding. VA/DC FIRST LEGO League was able to provide team support to approximately 30 new teams by providing financial support to those in underrepresented communities or those with financial hardships.



# **Letter from Assistant Director**

This season presented unfathomable challenges and at times seemed impossible. Last year marked our 20th year of serving FIRST LEGO League teams in Virginia and Washington, D.C. and we weren't sure if there would be a 21st season. With great challenges came great opportunities. Our dedicated community rallied together to not only make it happen but also continue to enhance our mission of inspiring young students at a time when relevant and engaging STEM programs have the greatest impact on their future endeavors.



Our volunteer coaches/mentors and teams made remarkable shifts that allowed them to meet and work safely. Teams across our region found creative ways to gather and engage in STEM learning. From meetings in garages and parking lots to completely virtual gatherings, our teams rose to the occasion and found new ways to innovate and collaborate. Coaches and team members passed robots from house to house, fundraised for additional equipment to allow for social distancing, interviewed experts over Zoom calls, and used online platforms to design and iterate their work. For several of the students we serve, this was the only extra-curricular activity that was available and in such a different school year, this opportunity meant more than ever.

The culminating event, a regional qualifying tournament or festival, is a big part of the FIRST LEGO League experience. The excitement and enthusiasm at a Virginia + Washington, D.C. FIRST LEGO League event are what keeps participants and volunteers coming back year after year. With the limitations imposed by the pandemic, our planning team was at a loss for how we could keep that energy going. Our regional leadership and event coordinators gave an incredible amount of their time brainstorming, planning, and implementing remote, or virtual events that would capture the spirit and energy of our usual season. These amazing volunteers agreed to the unknown but trusted the process. With their support and guidance, we were able to deliver a quality season full of innovation, discovery, and celebration.

This season would not have been possible without the support from our volunteer community (coaches, mentors, event coordinators, regional planning leadership, judges, and referees) as well as our amazing sponsors. The unprecedented events of the past year and a half have impacted all of our lives and there were so many reasons not to support our programs, but in the words of *FIRST* founder, Dean Kamen, *"Everybody has to be able to participate in a future that they want to live for. That's what technology can do."* Thank you for participating in a future that supports and encourages future leaders, thinkers, and innovators.

Sincerely, Kaitlin Ilnitzki Assistant Director Virginia + Washington, D.C. *FIRST* LEGO League