# Floty. <br> Leco <br> Multimedia Connections <br> EXPLORE 




FIRST:
(GEO) education

## FIRST ${ }^{\circledR}$ LEGO $^{\circledR}$ League Explore Multimedia Resources

Below is a list of Multimedia Resources for this season. These resources include links to websites, videos, building instructions, and other online tools related to the content of each session.

Some of the resources below are from third-party sites not developed or managed by FIRST ${ }^{\circledR}$ or LEGO ${ }^{\circledR}$ Education, but they're too great not to share!

You could share resources during sessions and/or encourage your students to explore them between sessions (with permission and supervision from a parent or guardian).

| General Resources |  |  |
| :---: | :---: | :---: |
| Support from LEGO <br> Education | Class Pack- FIRST LEGO League Explore | $\frac{\text { FIRST LEGO League }}{\text { (global) }}$ |
| Email for General Support | Teamwork Makes the Dream Work FIRST LEGO League Music Video | FIRSTLEGO League (US) |

## Coach \& Mentor Resources

FIRST Youth Protection
FIRST Volunteer
Resources

FIRST Mentor Network
FIRST Mentoring and Coaching with FIRST videos

Creating a Sense of Belonging Training

I Can Be Inclusive Too eCourse)

Supporting all Team Members: Inclusive Recruitment \& Enrollment Strategies

## Family Engagement

FIRST Family
Engagement Resources
LEGO ${ }^{\circledR}$ Family Fun -
things to do with kids

LEGO Education Let's
Build Together
LEGO ${ }^{\circledR}$ Family YouTube Channel

Articles for Families on Play from NAEYC

LEGO ${ }^{\circledR}$ Activities for 8- to 10-Year-Olds from Scholastic Parents


## Professional Development and Training Resources

## Hybrid \& Remote Learning Resources

- Hybrid \& Remote Learning Resources from FIRST - Developed for the 20202021 season and may be helpful if you need to lead FIRST LEGO League Explore in a remote or hybrid setting.
- FIRST LEGO League Explore Guide for Distance Education
- Hybrid \& Remote Learning Resources from LEGO Education


## FIRST Resources

- FIRST Certified Professional Development
- FIRST Education Philosophy
- FIRST LEGO League Explore Scope and Sequence Options
- 15 hours / 30 hours / 40 hours / 60 hours / 80 hours
- Explore Skills Progression - student learning outcomes by grade level
- Standards Alignments for FIRST LEGO League Explore
- FIRST Equity, Diversity, and Inclusion Training
- FIRST Equity, Diversity, and Inclusion Video Playlist
- FIRST Impact


## LEGO Education \& LEGO Foundation Resources

- LEGO Education Teacher Community
- Self-Guided Professional Development from LEGO Education
- LEGO Foundation's Research Knowledge Base
- Buying Replacement Parts


## Learning Through Play

- Let's Play activities from the LEGO Foundation
- Learning Through Play Whitepaper from LEGO Education
- Learning through Play: Education does not stop when recess begins from The Atlantic


## Research Resources

- Oregon School Library Information System
- OSLIS Elementary Research Videos
- How to Skype with an Expert in your Classroom from Class Tech Tips
- Nepris.com Tool to connect to industry professionals (Requires registering to access)

Team Management Resources

|  | $\frac{\text { How to Do Goal Setting With Your Students }}{\text { This School Year }}$ | Weareteachers.com |
| :--- | :--- | :--- |
| Gow To Set Goals (4 Easy Steps) | Rocket Kids - Length 4:40 |  |
|  | $\underline{\text { LearnStorm Growth Mindset: How to write a }}$ | Khan Academy - Length 2:52 |
| SMART goal | Give Every Student a Stake in Group Work | Common Sense Education |
|  | Hew Can Students Plan their Projects? | Thoughtful Learning |
|  | Kanban for Kids: Using Productivity Tools to <br> Raise Resilient Children | Kroid Robotics |
| The 9 Best Online Tools For Student Zone |  |  |

## Pre-Session Resources

## FIRST LEGO League Explore Resources

- Getting Started with FIRST LEGO League Explore video
- About FIRST LEGO League flyer
- Explore Team Management Resources
- Start A FIRST LEGO League Explore Team Flyer
- FIRST LEGO League Explore Mini Brochure
- FIRST LEGO League Explore: How It Works
- FIRST Mentor Network


## SUPERPOWEREDSM General Season

## Resources

- Season launch resources
- Links to season videos
- Explore Overview
- Explore Welcome Letter
- Explore Introduction
- Explore Set Building Instructions
- Student participation certificates

FIRST ENERGIZE ${ }^{\text {SM }}$ and SUPERPOWEREDSM season content

Logos to use in flyers, emails, or other resources you may wish to create)

SUPERPOWERED ${ }^{\text {SM }}$ Team Meeting Guide, Engineering Notebook and Individual Session PowerPoint Slides Google Slides version

- Found on Thinkscape through your FIRST Dashboard for US/CAN or through your country's Program Delivery Partner.

SUPERPOWEREDSM FIRST LEGO League Video Resources on the FIRST LEGO League YouTube Channel

## Core Values Resources

|  | The Squirrels who Squabbled by Rachel | Fiction book about conflicts |
| :--- | :--- | :--- |
| Bright | A Little SPOT of Teamwork: A Story About <br> Collaboration and Leadership by Diane Alber | Fiction book about teamwork |
|  | Brave Irene by William Steig | Fiction book about perseverance |
| $\Delta$ | The Invisible Boy by Patrice Barton | Fiction book about inclusion |
| $\Delta$ | My Mouth is a Volcano! by Julia Cook | Fiction book about taking turns |
| $\Delta$ | The Little Red Pen by Janet Stevens | Fiction book about cooperation |

## Core Values Resources

| $\square$ | FIRST at Home activities | A variety of resources, activities and links available for free from FIRST |
| :---: | :---: | :---: |
|  | FIRST Core Values through Social, Emotional Learning Activities | Part of the FIRST at Home activities |
| - | Core Values Activities | Droid Robotics |
| $3$ | 22 Fun Team Building Games \& Activities for Kids | UNICEF |
|  | 33+ Awesome Team-Building Games and Activities for Kids | We Are Teachers |
| $\square$ | Team Building for Kids: A Complete Guide | Venture Team Building |
| $\square$ | Great Group Games: Team Building for Kids | Scholastic |
|  | Team Building and Cooperative Games Physical Education | Jakob Gyring - PE Teacher in Norway |
|  | All Together - Team Building Game - Ultimate Camp Resource | A teambuilding game from Ultimatecampresource.com Length 0:35 |
| 5 | The Hand Game | A teambuilding game from Ultimatecampresource.com Length 1:20 |
|  | Summer Camp Team Building Activities For Kids | Quick Team Building Activities Length 4:42 |
| 5 | Team Building Games YouTube Channel | Herman Otten, Teambuilding and Communications trainer from the Netherlands |
|  | How Google builds the perfect team | Tech Insider - Length 2:22 |
| 17 | The Big Book of Teambuilding Games | Trust-Building Activities, Team Spirit Exercises, and Other Fun Things to Do by John W. Newstrom, Edward E. Scannell |
| $\Downarrow$ | Really Fun Team Building Activities for Kids | By Jeff Millett |
| 3 | Duct Tape Teambuilding Games -- 50 Fun Activities to Help Your Team Stick Together | By Tom Heck |
| $\Delta$ | Silver Bullets: A Revised Guide to Initiative Problems, Adventure Games, and Trust Activities | by Project Adventure |
| $\cdots$ | Cowstails and Cobras 2: A Guide to Games, Initiatives, Ropes Courses \& Adventure Curriculum | by Karl Rohnke |
| $\geqslant$ | Quicksilver (0) © | by Steve Butler |

## Robotics Resources

## Robot Design Resources

|  | Technical Resources | Links from FIRST to LEGO Education <br> SPIKETM Essential and WeDo 2.0 <br> Resources |
| :---: | :--- | :--- |
|  | Buying Replacement Parts | LEGO Education |
|  | Building ideas from the author |  |

## LEGO Education WeDo 2.0 Resources

- Getting Started with WeDo 2.0
- LEGO Education WeDo 2.0 Element Survey Page
- Download WeDo 2.0 Software and view System Requirements
- WeDo 2.0 Product Support
- WeDo 2.0 Lessons
- Spy Robot Lesson
- Glowing Snail Lesson
- Cooling Fan Lesson
- Moving Satellite Lesson
- Milo, the Science Rover Lesson
- Moving Materials Lesson
- City Safety lesson


## LEGO Education SPIKE Essential Resources

- Software Download
- FIRST LEGO League Explore Unit
- Element Survey Page
- Getting Started with SPIKE Essential
- SPIKE Essential Unit Plans
- SPIKE Essential Resources
- Product Support Videos

Engineering Design Process, Design, and Computational Thinking

|  | What is Computational Thinking? | Teach Your Kids Code |
| :--- | :--- | :--- |
|  | Khe Engineering Process: Crash Course | Crash Course Kids - Length 5:16 |
| Kids \#12.2 | YouTube Playlist from FIRST LEGO <br> League - From 2016 |  |
|  | Ene Engineering Design Process | Engineering Design Process Curriculum | Teach Engineering.org.

## SUPERPOWERED ${ }^{\text {SM }}$ Resources

| General Energy Resources |  |  |
| :---: | :---: | :---: |
| , | PBS Learning Media for students | Search "energy" |
|  | National Energy Education Development (NEED) Student Energy Information \& Resources | Background info for teams, videos, and more resources |
|  | NEED Energy Graphics | Energy graphics resources for teams |
|  | $\mathrm{e}^{2} \mid$ podcasts \| PBS | Energy podcasts from the PBS series $\mathrm{e}^{2}$ |
| - | Alliant Energy Kids | Energy information and teacher resources from Alliant Energy |
| $\cdots$ | Department of Economic and Social Affairs Sustainable Development | United Nations |
|  | US Energy Information Association Energy Kids | Background information for teams, videos, games, and more |
| , | Learning Resources about Energy Efficiency | NH Saves |
|  | US Department of Energy | General energy information and career resources - Background information for teachers |
| $\square$ | Lesson Plans, Teacher Guides and Online Environmental Resources for Educators: Energy | United States Environmental Protection Agency Teacher Lesson plans \& Resources |
| $\cdots$ | Lesson Plans on Energy | Mountain Electric Cooperative |
|  | Free Teaching resources about climate and energy | Climate Literacy and Energy Awareness Network (CLEAN) |
|  | Energy Safe Kids | Activities, info, lesson plans about safety around natural gas |
| 4 | STEM Classroom Activities \& Resources | Shell |
| $\geqslant$ | Energy reading recommendations by grade level (grades 3-5) | Project Learning Tree |
| 13 | Energy reading recommendations by grade level (grades K-2) | Project Learning Tree |
| 17 | Energy Theme Reading List for Pre-Schools and Primary | Green Schools Ireland |
| 12 | Climate Change \& Environmental Books for Children | climatecaretakers.org |
| 1 | Energy and Sustainability Book Recommendations | Sustainable Wellesley |

## Resources by Session

## Session 1: Energy Journeys

| F\% | History of Energy | ENERGYminute - Length 5:30 |
| :---: | :---: | :---: |
| Fer | Ask APS: How does electricity get to my house? | Arizona Public Service - Length 3:11 |
| F\% | Energy Explained: Where does it come from and how much do we use? | ```Inside Energy - Length 3:25 (from 2017)``` |
| Fer | Where does my power come from? | Electric Authority New Zealand Length 3:33 |
| F | How Electricity is Made | Idaho Power - Length 2:19 |
| F\% | Electricity 101: How Power Gets to Your Home | FirstEnergy - Length 1:12 |
| Fre | How Power Gets to Your House | EPCOR - Length 2:35 |
| F | Power Generation | PSEG Long Island - Length 2:35 |
| Fres | The journey of hydropower: How energy moves from nature to your home | Bonneville Power based in Portland -Length 14:01 |
| F\% | How Do We Use Energy at Home? | The Atlantic - Length 1:55 |
| F\% | Solar energy for kids: Learn how electricity works | Alliant Energy - Length 5:24 |
| - | What is Nuclear Energy? | Nuclear Energy Institute |
| F | Bioenergy: America's Energy Future | US Department of Energy - Length 15:00 - from 2014 |
| F\% | How Rotting Vegetables Make Electricity World Wide Waste | Business Insider - Length 5:31 |
| - | Energy Harvesting: Pavegen and the Rise of Kinetic Tile Tech | The Switch UK |

Session 2: Energy Sources

|  | Wind Power | NOVA PBS Official - Length 2:33from 2012 |
| :---: | :---: | :---: |
|  | Energy 101: Wind Power | US Department of Energy - Length $3: 16$ |
|  | How is wind energy produced? Sustainability for kids Part 1 | From Vestas - Length 2:06 |
|  | How does a wind turbine work? Sustainability for kids Part 2 | Vestas - Length 2:46 |
|  | 8 Inventions and Technologies that will Change our World! | Innovative Techs - Length 7:56 reviews innovative energy designs |

## Resources by Session

| More Session 2: Energy Sources |  |  |
| :--- | :--- | :--- |
|  | How does renewable energy work? Solar, <br> Wind \& Wave power Explained | LEGO - Length 9:21 |
|  | Renewable energy lessons | LEGO Education |
| Fossil Fuels 101 | Fossil Fuels 101 from Student Energy - <br> Length 2:42 |  |
|  | How do wind turbines work? - Rebecca J. <br> Barthelmie and Sara C. Pryor | Ted-Ed - Length 5:02 |
|  | Advantages and Disadvantages of Using <br> Renewable Energy - Alternative Energy | Dynamic Earth Learning - Length 3:12 |
| Lesson Plans Middle | Who Cleans Up When a Wind Farm | Inside Energy - Length 5:36 |

Session 3: Energy Connections

| F\% | How does a battery work? - Simple and easy explanation for kids | Phil McCordic - Length 4:56 |
| :---: | :---: | :---: |
| F | How do batteries work? | Mystery Doug - Length 6:02 |
| - | How Batteries Work: An Animated Guide to the Science of Batteries | Save on Energy |
| F | The Power of Circuits! | SciShow Kids - Length 4:41 |
| F | World's Largest Batteries - (Pumped Storage) | Practical Engineering - Length 9:12 |
| $\cdots$ | Heated Volcanic Rocks Store Energy | The American Society of Mechanical Engineers |
| 3 | Pumped Hydro Storage | GE Renewable Energy |
| V | Storing Electricity - SWITCH ENERGY ALLIANCE | Switch Energy Alliance - Length 3:00 |
| F | The Future Of Energy Storage Beyond Lithium Ion | CNBC - Length 14:21 |
| F10 | The Smart Grid Explained - An Understanding for Everyone | EPCE (Energy Providers Coalition for Education) - Length 3:00-From 2011 |
| $\cdots$ | The Smart Grid | US Department of Energy Office of Electricity |
| F\% | Oil Platform vs Super Typhoon: Weathering the Storm from Korea to the Gulf of Mexico | Shell - Length 11:55 |
| \% | Solar with Storage: The Basics | Energy Queensland - Length 1:41 |
| Ca | How Australia's Most Powerful \$16 Billion Solar Power Plant Will Power Singapore | Innovative Techs - Length 6:26 |

## Resources by Session

| Session 4: Energy Consumption |  |  |
| :--- | :--- | :--- |
|  | $\underline{\text { How Does A "Fairground Carousel" Work? }}$ | Maddie's Do You Know? - Length 6:00 |
|  | Solar-Powered Theme Park Uses the Sun <br> and People to Run Its Rides | Mashable Deals - Length 1:53 |
|  | Six Flags Discovery Kingdom Powered with <br> Solar Energy | sPower US - Length 5:03 |
|  | Portable Water Turbine that Charges <br> Phones | HENRY FORD Museum - Length 2:30 |
|  | Energy Conservation and Emissions <br> Reduction | Disneyland Public Affairs |
| Around the World | Disney Parks Blog |  |
|  | Estimating Appliance and Home Electronic <br> Energy Use | US Department of Energy |
|  | How Much Electricity do my Home <br> Appliances Use? | IGS Renewable Energy company |


| Session 5: Energy Capture |  |  |
| :---: | :---: | :---: |
|  | SPIKE Essential FIRST LEGO League Explore Unit: Lesson 1 | LEGO Education |
| $\square$ | WeDo 2.0 Classroom Projects: Cooling Fan | LEGO Education |
| 5 | The Physics of Windmill Design | Minutephysics - Length 3:26 |
| 5 | Should Wind Turbines Have TWO Blades? | Engineering with Rosie - 6:14 |
|  | Why Wind Farms Don't Always Turn When It's Windy | Tom Scott - Length 1:55 |
|  | Wind turbine energy storage - IN 60 SECONDS | DOB-Academy - Length 1:25 |
|  | The Glaring Engineering Mistake That Made Wind Turbines Inefficient | Discovery UK - Length 7:46 |
|  | Wind power storage plant \| ACCIONA | Acconia - Length 1:38 |
|  | What's Good and What's Bad about Wind Energy? | Kids Discover |
| $\cdots$ | Curious Facts about Wind Power | Curious Kate on Fun Kids Radio website, video, and audio podcast |

## Resources by Session

## Session 6: Motorize Model

| $\cdots$ | SPIKE Essential FIRST LEGO League Explore Unit: Lesson 2 | LEGO Education |
| :---: | :---: | :---: |
| $\cdots$ | WeDo 2.0 Classroom Projects: Spy Robot | LEGO Education |
| Fres | Enercon E126 - The Most Powerful Wind Turbine in The World | Extreme World - Length 3:42 |
| F | The World's Biggest Wind Turbine | Tech Vision - Length 8:09 |
| Fres | Virtual Wind Farm Tour Ep 5: The Nacelle | EDP Renewables - Length 2:51 |
| Fres | MJR Power \& Automation Offshore Wind On-Turbine Vessel Charging System | MJR Power \& Automation - Length 3:01 |
| F | Northwest Crane Service, L.L.C. Liebherr LTM 1750-9.1 Kansas Wind Turbine Project | $\begin{aligned} & \text { Northwest Crane Service - Length } \\ & 5: 09 \end{aligned}$ |

## Session 7: Electric Car

| - | SPIKE Essential FIRST LEGO League Explore Unit: Lesson 3 | Lesson from LEGO Education |
| :---: | :---: | :---: |
| $\cdots$ | WeDo 2.0 Classroom Projects: Milo the Science Rover | Lesson from LEGO Education |
| F\% | Amazon's custom electric delivery vehicles hit the road in LA | From Amazon News - Length 1:01 |
| $\cdots$ | Henry Ford Museum | Virtual Field Trip for students |
| , | Carl Gets Some Rest: A Coloring and Story Book | A downloadable coloring about transportation alternatives from the US Environmental Protection Agency |
| 3 | What is a Hybrid Car and How Do They Work? | Car and Driver |
| F6 | What's next for oil? \| CNBC Explains | CNBC - Length 3:32 |
| Frer | VIDEO: Investing in Electric Car Charging Stations | WKRG News from Mobile, AL - Length 2:35 |
| - | The future of gas stations: Do EVs dismantle local pumps? | Road Show by CNET article and video |
| 1 | Driving to Combat Climate Change | Amazon |



## Resources by Session

## Sessions 8-9: Team Model

|  | Recap of the 2019 FIRST LEGO League | Length 1:09. <br> *Have your students watch for <br> example team models in the video. |
| :--- | :--- | :--- |
| World Festival in Detroit | USPTO Educational for Kids, Parents, and | United States Patent and Trademark <br> Office |
| Teachers | Theres's Got to be a Better Way - <br> children's from Fun Kids - UK Station |  |
| Developing a Product | Article from Connected Science <br> Learning |  |
| Prototyping Builds Resiliency | Science of Innovation: What Is Innovation? | NBC News Learn - Length 6:56 |
|  | $\frac{\text { Designing and Building the LEGO Model \& }}{\text { Creating the Show-Me-Poster }}$ | Coach webinar from FIRST in Texas - <br> Length 30:24 |

## Session 10-11: Team Poster

| F\% | Recap of the 2019 FIRST LEGO League World Festival in Houston |
| :---: | :---: |
| C | Sessions 10 \& 11 - The Show Me Poster English |
| L | Team poster - FIRST $^{\circledR}$ LEGO $^{\circledR}$ League Explore |
| 5 | FIRST ${ }^{\circledR}$ LEGO $^{\circledR}$ League Jr. Boomtown Build Season - Sessions 10 \& 11; Make your Show Me Poster! |
| , | 6 tips for teaching students to create awesome science posters |


| Session 12: Prepare for Event |  |  |  |
| :--- | :--- | :--- | :---: |
|  | Schooled by Kids: <br> Presentatio Skills, Part 1 | From Green Ivy Schools. Part 1 Length <br> $1: 44$ / Part 2 Length 1:31 |  |
| Presentation Skill, Part 2 |  |  |  |$\quad$| The IET in the United Kingdom - |
| :--- |
| Length 1:39 |

## Career Resources

| General Career Resources |  |  |
| :---: | :--- | :--- |
|  | Visit the Learning Lab and search <br> careers from A-Z | PBS LearningMedia |
|  | Amazon Future Engineer Class Chat | Amazon |
|  | $\underline{\text { O*NET OnLine }}$ | United States Department of Labor |
|  | $\underline{\text { Career Exploration Lesson Plans }}$ | Nebraska Department of Education |
| Grades Pesources for Elementary | Workforce Solutions |  |
|  | $\underline{\text { Career Exploration }}$ | Career profiles from the United States <br> Bureau for Labor and Statistics |


| Energy Career Resources |  |  |
| :--- | :--- | :--- |
|  | The Office of Energy Efficiency and <br> Renewable Energy Career Resources | United States Department of Energy |
|  | Get into Energy | Center for Workforce Development |
| Get Energised: Careers in renewable | National Museums Scotland - Length 3:08 |  |
| energy | Career Girls |  |
| Energy Cluster | Renewable Energy Engineering Jobs: <br> My Education and Career Path as a <br> Mechanical Engineer | Engineering with Rosie - Length 8:09 |
| A Day In The Life Of A Wind Turbine | Broadcast Media Services - Length 5:55 |  |
| Engineer | Energizing Careers at Consumers <br> Energy | Consumers Energy - Length 3:57 |
| Day In The Life of a Lineman | Community Electric Cooperative - Length <br> $6: 27$ |  |
| Women in Energy | RTI International - Length 3:31 |  |
| Women at Imperial: Inspiring women in | Energy Futures Lab - Length 3:31 |  |
| the energy sector | Member Spotlight: Maria Telkes, | Society of Women Engineers |
| Biophysicist \& Inventor |  |  |

## Additional Resources

| Extension Activity Resources |  |  |
| :---: | :---: | :---: |
| $\square$ | FIRST@Home | These free activities supplement the FIRST season materials. |
| $\cdots$ | What is a Robot? | Lesson plan from PBS Learning Media |
|  | Wild-Inspired Robotic Arms | Video, background reading, and lesson plan from PBS Learning Media |
| , | Evaluating Legitimate Sources | Lesson Plan from Common Sense Media |
| 3 | Engineering for Good | Project-based Unit from PBS Learning Media |
| 17 | Project Management Fiction Books for Youth Ages 10-12 | Project Management Institute Educational Foundation |
| 17 | Books on Inventors | Inventive Kids |
| $\square$ | Invent It, Build It | Lesson plan from PBS Kids |
| - | Invention Education Curricula | Links to invention-focused lesson plans from Invent Ed |
|  | Drawing Designs in Detail | Hands-on activity plan from teachengineering.org |
| $\cdots$ | Energy Transfer Lesson for Kids Sound, Light \& Heat, Grades 3-5 | Lesson Plan from Generation Genius |
|  | Windmill STEM Challenge - The Boy Who Harnessed The Wind | Activity about wind power for Teams with book link |
| $\square$ | Nuclear Science Lesson Plans | Nuclear Science Week |
| $\square$ | The Sustainable Transportation Lesson Package | Learning for Sustainable Future |
| $\cdots$ | Flow of Electrons, Circuits, and Batteries | Lesson plan from the National Electronics Museum |
|  | HANDS-ON ACTIVITY: Two-Cell Battery | Teachengineering.org Lesson Plan |
|  | Behind the Scenes Tour of Robotics at an Amazon Fulfillment Center | Amazon |
| $\cdots$ | Human and Robots Working together | Amazon |
| $\square$ | Renewable Energy Lessons | Minecraft Education Edition |



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