

**FIRST[®]
LEGO[®]
LEAGUE**
CHALLENGE

Multimedia Connections



FIRST® LEGO® League Challenge

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® or LEGO® 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 Education | Class Pack- FIRST LEGO League Challenge | FIRST LEGO League (global) |
| Email for General Support | Teamwork Makes the Dream Work FIRST LEGO League Music Video | FIRST LEGO League (US) |

Coach & Mentor Resources

| | | |
|--|--|---|
| FIRST Youth Protection | FIRST Mentor Network | Coach Corner resources (Community created resources by Droid Robotics) |
| FIRST Volunteer Resources | FIRST Mentoring and Coaching with FIRST videos | I Can Be Inclusive Too e-Course) |
| Creating a Sense of Belonging Training | Supporting all Team Members: Inclusive Recruitment & Enrollment Strategies | |



Professional Development and Training Resources

Hybrid & Remote Learning Resources

- [Hybrid & Remote Learning Resources from FIRST](#) – Developed for the 2020-2021 season and may be helpful if you need to lead *FIRST* LEGO League Challenge in a remote or hybrid setting during 2022-2023 SUPERPOWERED season.
 - [FIRST LEGO League Challenge Guide for Distance Education](#)
- [Hybrid & Remote Learning Resources from LEGO Education](#)

FIRST Resources


- [FIRST Certified Professional Development](#)
- [FIRST Education Philosophy](#)
- [FIRST LEGO League Challenge Scope and Sequence Options](#)
 - 30 hours / 40 hours / 60 hours / 80 hours / 100 hours
- [Challenge Skills Progression - student learning outcomes by grade level](#)
- [Standards Alignments for FIRST LEGO League Challenge](#)
- [FIRST Equity, Diversity, and Inclusion Training](#)

- [FIRST Equity, Diversity, and Inclusion Video Playlist](#)
- [FIRST Impact](#)
- [Class Pack video playlist](#)

LEGO Education & LEGO Foundation Resources

- [Learning Through Play Whitepaper](#)
- [LEGO Education Teacher Community](#)
- [Self-Guided Professional Development from LEGO Education](#)
- [LEGO Foundation's Research Knowledge Base](#)
- SPIKE™ PRIME Professional Development
 - [Product Support for SPIKE Prime Professional Development](#)
 - [Classroom Management - SPIKE™ Prime Professional Development](#)
 - [Pedagogy - SPIKE™ Prime Professional Development](#)
 - [21st Century Skills - SPIKE™ Prime Professional Development](#)
 - [STEAM Concepts - SPIKE™ Prime Professional Development](#)

Engineering Design Process, Design Thinking, and Computational Thinking

| | | |
|---|---|--|
|  | What is Computational Thinking? | Teach Your Kids Code |
|  | The Engineering Process: Crash Course Kids #12.2 | Crash Course Kids – Length 5:16 |
|  | The Engineering Design Process | YouTube Playlist from <i>FIRST</i> LEGO League – From 2016 |
|  | Engineering Design Process Curriculum | Teach Engineering.org |
|  | Engineering Design Process – Choose the Best Solution | Science Buddies |
|  | Engineering Design Process | NASA |
|  | Design Thinking Resources for Educators | Innovation Training |
|  | Design Thinking: A Problem Solving Framework | Edutopia – Length 5:22 |

Pre-Session Resources

FIRST LEGO League Challenge Resources

- [About FIRST LEGO League flyer](#)
- [Start a FIRST LEGO League Challenge Team Flyer](#)
- [FIRST LEGO League Challenge: How It Works](#)
- [FIRST LEGO League Challenge Mini Brochure](#)
- [Challenge Team Management Resources](#)

Community Created Resources

- [Challenge Worksheets and Guides](#) (created by Droid Robotics)
- [Share and Learn Learning Content](#) (created by Droid Robotics)

SUPERPOWEREDSM General Season Resources

- Links to season videos
- Challenge Overview
- Challenge Welcome Letter
- Challenge Introduction
- Robot Game Rulebook
- Table building instructions
- Challenge updates
- Student participation certificates

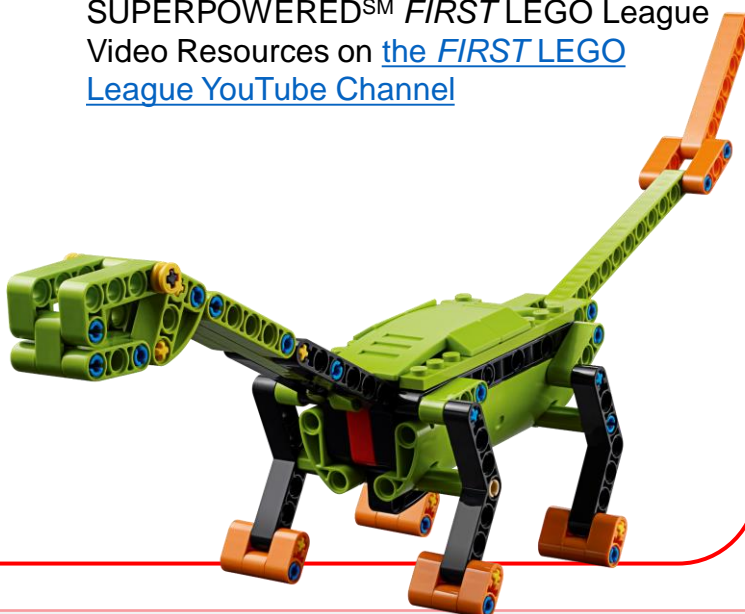
[FIRST ENERGIZESM](#) and [SUPERPOWEREDSM](#) season content

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









SUPERPOWEREDSM *Team Meeting Guide*, *Engineering Notebook* and Individual Session PowerPoint Slides ([Google Slides version](#))

- Found on Thinkspace 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](#)



Team Management Resources
















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






Core Values Resources

| | | |
|---|---|--|
|  | <u>FIRST at Home activities</u> | A variety of resources, activities and links available for free from <i>FIRST</i> |
|  | <u>FIRST Core Values through Social, Emotional Learning Activities</u> | Part of the <i>FIRST</i> at Home activities |
|  | <u>Core Values Activities</u> | Droid Robotics |
|  | <u>22 Fun Team Building Games & Activities for Kids</u> | Unicef |
|  | <u>33+ Awesome Team-Building Games and Activities for Kids</u> | We Are Teachers |
|  | <u>Team Building for Kids: A Complete Guide</u> | Venture Team Building |
|  | <u>Great Group Games: Team Building for Kids</u> | Scholastic |
|  | <u>Team Building and Cooperative Games - Physical Education</u> | Jakob Gyiring - PE Teacher in Norway |
|  | <u>All Together - Team Building Game - Ultimate Camp Resource</u> | A teambuilding game from Ultimatecampresource.com - Length 0:35 |
|  | <u>The Hand Game</u> | A teambuilding game from Ultimatecampresource.com - Length 1:20 |
|  | <u>Summer Camp Team Building Activities For Kids</u> | Quick Team Building Activities - Length 4:42 |
|  | <u>Team Building Games YouTube Channel</u> | Herman Otten, Teambuilding and Communications trainer from the Netherlands |
|  | <u>How Google builds the perfect team</u> | Tech Insider – Length 2:22 |
|  | 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 |
|  | Really Fun Team Building Activities for Kids | By Jeff Millett |
|  | Duct Tape Teambuilding Games -- 50 Fun Activities to Help Your Team Stick Together | By Tom Heck |
|  | Silver Bullets: A Revised Guide to Initiative Problems, Adventure Games, and Trust Activities | by Project Adventure |
|  | Cowstails and Cobras 2: A Guide to Games, Initiatives, Ropes Courses & Adventure Curriculum | by Karl Rohnke |
|  | Quicksilver | by Steve Butler |









Robotics Resources

| Robot Design Resources | | |
|---|---|---|
|  | Robot Design and Robot Game Activities | Droid Robotics |
|  | Community Webinar: Robot Design, Engineering Process, and Documentation | Droid Robotics |
|  | Community Webinar: Programming For Reliability | Droid Robotics |
|  | Community Webinar: Building for Reliability | Droid Robotics |
|  | Community Webinar: Building Attachments Tips and Tricks | Droid Robotics |
|  | Community Webinar: How to Develop a Robot Strategy | Droid Robotics |
|  | FLL Drive Straight Program Tutorial - Line Assisted Gyro Steering - FLL City Shaper | Waring Robotics - FTC & FLL |
|  | FLL - Intro to Basic Rack and Pinion Linear Designs | Skill Build - Youtube channel run by an experience <i>FIRST</i> LEGO League participant |
|  | How to Design your Robot to Meet Game Requirements | NanoGiants Academy |
|  | The LEGO Technic Idea Book: Simple Machines | by Yoshihito Isogawa |
|  | The LEGO Technic Idea Book: Wheeled Wonders | by Yoshihito Isogawa |
|  | The LEGO Technic Idea Book: Fantastic Contraptions | by Yoshihito Isogawa |
|  | The LEGO Power Functions Idea Book, Volume 1: Machines and Mechanisms | by Yoshihito Isogawa |
|  | The LEGO Power Functions Idea Book, Vol. 2: Cars and Contraptions | by Yoshihito Isogawa |
|  | LEGO Technic Non-Electric Models: Simple Machines | by Yoshihito Isogawa |



| SPIKE Prime Resources | | |
|---|---|----------------|
|  | Download Software and System Requirements | LEGO Education |
|  | SPIKE Prime Computer Science Courses | LEGO Education |
|  | SPIKE Prime Product Support Resources | LEGO Education |
|  | SPIKE Prime Computer Science Courses | LEGO Education |
|  | SPIKE Prime Product Support Resources | LEGO Education |







Robotics Resources









| More SPIKE Prime Resources | | |
|---|---|---|
|  | Training Camp 1: Driving Around Lesson | SPIKE Prime Competition Ready Unit <i>Supports Session 2</i> |
|  | Training Camp 2: Playing with Objects Lesson | SPIKE Prime Competition Ready Unit <i>Supports Session 3</i> |
|  | Training Camp 3: Reacting to Lines Lesson | SPIKE Prime Competition Ready Unit <i>Supports Session 4</i> |
|  | Assembling an Advanced Driving Base Lesson | SPIKE Prime Competition Ready Unit <i>Supports Session 6</i> |
|  | My Code, Our Program Lesson | SPIKE Prime Competition Ready Unit |
|  | Time for an Upgrade Lesson | SPIKE Prime Competition Ready Unit |
|  | Mission Ready Lesson | SPIKE Prime Competition Ready Unit |
|  | Mission Training: Creative Problem Solving | SPIKE Prime Competition Ready Unit |
|  | SPIKE Prime Supplementary Lessons | SPIKE Prime Competition Ready Unit |
|  | Guided Mission | SPIKE Prime Competition Ready Unit <i>Supports Session 5</i> |
|  | SPIKE Prime Programming for <i>FIRST</i> LEGO League playlist | Bruce Schafer |
|  | Prime Lessons | Droid Robotics |



| MINDSTORMS EV3 Resources | | |
|---|---|--|
|  | Download Software and System Requirements | LEGO Education |
|  | MINDSTORMS EV3 Product Support Page | MINDSTORMS EV3 Resources |
|  | Robot Trainer Unit | MINDSTORMS EV3 Resources |
|  | Objects and Obstacles | MINDSTORMS EV3 Robot Trainer Unit <i>Supports Session 2</i> |
|  | Grab and Release | MINDSTORMS EV3 Robot Trainer Unit <i>Supports Session 3</i> |
|  | Colors and Lines | MINDSTORMS EV3 Robot Trainer Unit <i>Supports Session 4</i> |
|  | Angles and Patterns | MINDSTORMS EV3 Robot Trainer Unit <i>Supports Session 6</i> |
|  | Real World Vehicles Unit | MINDSTORMS EV3 Resources |
|  | Coding Activities Lessons | MINDSTORMS EV3 Resources |

Robotics Resources

| More MINDSTORMS EV3 Resources | | |
|---|---|-----------------------------------|
|  | Competing in <i>FIRST</i> LEGO League with EV3 | <i>FIRST</i> |
|  | EV3 Lessons | Droid Robotics |
|  | Building instructions for robots using one LEGO MINDSTORMS Education core set | NanoGiants Academy |
|  | EV3 Programming Videos YouTube Playlist | W.A.F.F.L.E.S. Community Robotics |









| More Robotics Resources | | |
|---|--|---|
|  | Technical Resources | Links from <i>FIRST</i> to LEGO Education SPIKE™ Prime, LEGO MINDSTORMS EV3, and Robot Inventor Resources |
|  | Buying Replacement Parts | LEGO Education |
|  | Builderdude Robotics Tutorials | Builderdude, former <i>FIRST</i> LEGO League participant |
|  | Mr. Hino's LEGO Robotics YouTube Channel | Mr. Hino |
|  | Droid Robotics YouTube Channel | Droid Robotics |
|  | BrickWise YouTube Channel | Former members of the Tacocats |
|  | Brickering YouTube Channel | Franklin, an experienced <i>FIRST</i> LEGO League participant |
|  | Oregon Robotics Tournament and Outreach Program (ORTOP) Wiki | Links to support resources for <i>FIRST</i> participants |









Innovation Project Resources



General Innovation Project Resources

| | | |
|---|--|---|
|  | Innovation Project Activities | Droid Robotics |
|  | Innovation Project for <i>FIRST</i> LEGO League: Building Problem Solvers 2021-2022 | The Moment Makers, former <i>FIRST</i> LEGO League team from Pearland, TX |
|  | Science of Innovation: What Is Innovation? | NBC News Learn – Length 6:56 |
|  | USPTO Educational for Kids, Parents, and Teachers | United States Patent and Trademark Office |
|  | Project – How To Videos | YouTube Playlist from <i>FIRST</i> – from 2016 |
|  | Coaching a Team on the <i>FIRST</i> LEGO League Challenge Innovation Project 9-14-2020 | Webinar from ORTOP – Length 54:19 |
|  | 2021 Global Innovation Awards Team Innovations | <i>FIRST</i> |
|  | 2021 Global Innovation Awards Team Pitches | <i>FIRST</i> |

How to do Research







| | | |
|---|--|---|
|  | How to Pick a Project Topic and Conduct Research | Share & Learn Webinar Series from Droid Robotics – Length 40:10 |
|  | Oregon School Library Information System | Resources on how to do research for students and teachers from the Oregon Association of School Libraries |
|  | OSLIS Elementary Research Videos | Oregon School Library Information System YouTube Channel |
|  | Essential Google Search Tricks for Research | Common Sense Media – Length 6:42 |
|  | Reading more than one source on a topic | Khan Academy – Length 3:15 |
|  | Writing Videos for Kids: How to Evaluate Sources for Reliability | Teaching without Frills – Length 3:48 |

Product Design






| | | |
|---|--|---|
|  | Innovation Project for <i>FIRST</i> LEGO League: Create and Iterate your Prototype | The Moment Makers, former <i>FIRST</i> LEGO League team from Pearland, TX |
|  | There's Got to be a Better Way – Developing a Product | Resources from Fun Kids – UK children's Radio Station |
|  | Prototyping Builds Resiliency | Article from Connected Science Learning |

Innovation Project Resources








Getting Feedback on your Idea

| | | |
|---|--|--|
|  | Designing a Survey (Math) | Lesson plan from California Educators Together (<i>Requires registering to access</i>) |
|  | Creating Surveys | Droid Robotics – Length 20:25 |
|  | How to Skype with an Expert in your Classroom | Class Tech Tips |
|  | Nepris.com | Tool to connect to industry professionals (<i>Requires registering to access</i>) |
|  | How to Help Students Develop Interviewing Skills | Edutopia |
|  | FIRST Mentor Network | Interactive platform allowing teams and interested mentors to find each other |

Giving Presentations

| | | |
|---|---|--|
|  | Project Presentation Tips and Tricks | Share & Learn Webinar Series from Droid Robotics – Length 43:00 |
|  | Schooled by Kids: Presentation Skills, Part 1 Presentation Skills, Part 2 | Green Ivy Schools. Part 1 Length 1:44 / Part 2 Length 1:31 |
|  | Expanding Students' Ideas About How to Give Presentations | Edutopia |
|  | 2014 FLL World Class – Project Presentation – Team 2766 | Example project presentation – Length 6:10. Search YouTube for many more examples. |
|  | FIRST LEGO League Best Presentation - West Linton Wasps | Example project presentation – Length 4:56 |

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 |
|  | e² podcasts PBS | Energy podcasts from the PBS series e ² |
|  | Alliant Energy Kids | Energy information and teacher resources from Alliant Energy |
|  | Environmental Sustainability from the Walt Disney Company | Information about Disney environmental initiatives |
|  | Department of Economic and Social Affairs Sustainable Development | United Nations |

Innovation Project Resources

| More General Energy Resources | | |
|---|---|--|
|  | US Energy Information Association Energy Kids | Background info for teams, videos, games, and more |
|  | National Energy Foundation National Energy Literacy Survey | Data from an energy survey of high school students |
|  | Learning Resources about Energy Efficiency | NH Saves |
|  | US Department of Energy | General energy information and career resources |
|  | Estimating Appliance and Home Electronic Energy Use | US Department of Energy |
|  | Lesson Plans, Teacher Guides and Online Environmental Resources for Educators: Energy | United States Environmental Protection Agency Teacher Lesson plans & Resources |
|  | International energy trade resources | US Department of Commerce International Trade Administration |
|  | Stanford University Energy Research | Compilation of energy research articles |
|  | Lesson Plans on Energy | Mountain Electric Cooperative |
|  | R.E.A.C.T. Renewable Energy Activities – Choices for Tomorrow | National Renewable Energy Laboratory |
|  | Free Teaching resources about climate and energy | Climate Literacy and Energy Awareness Network (CLEAN) |
|  | How Much Electricity do my Home Appliances Use? | IGS Renewable Energy company |
|  | Energy reading recommendations by grade level (grades 3-5) | Project Learning Tree |
|  | Energy reading recommendations by grade level (grades 6-8) | Project Learning Tree |
|  | Energy Theme Reading List for Pre-Schools and Primary | Green Schools Ireland |
|  | Climate Change & Environmental Books for Children | climatecaretakers.org |
|  | Energy and Sustainability Book Recommendations | Sustainable Wellesley |
|  | Solar energy for kids: Learn how electricity works | Alliant Energy - Length 5:24 |
|  | Energy Explained: Where does it come from and how much do we use? | Inside Energy - Length 3:25 (from 2017) |
|  | History of Energy | ENERGYminute - Length 5:30 |
|  | Where does my power come from? | Electric Authority New Zealand - Length 3:33 |
|  | How Electricity is Made | Idaho Power - Length 2:19 |

Innovation Project Resources

More General Energy Resources

| | | |
|---|---|--|
|  | Ask APS: How does electricity get to my house? | Arizona Public Service - Length 3:11 |
|  | Repairing Underground Power Cables Is Nearly Impossible | Practical Engineering - Length 13:33 |
|  | How 'The Mandalorian' is Revolutionizing Virtual Production and Reducing its Carbon Footprint | Video and article from Variety - Length 6:41 |









White Energy Journey Resources

| | | |
|---|---|---|
|  | Heated Volcanic Rocks Store Energy | The American Society of Mechanical Engineers |
|  | Volcanic Rock Offers New Take on Energy Storage | Power Magazine |
|  | Sustainability plans from Siemens Gamesa | Company that makes wind turbines |
|  | Wind Power | NOVA PBS Official - Length 2:33 – from 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 |
|  | How do wind turbines work? - Rebecca J. Barthelmie and Sara C. Pryor | Ted-Ed - Length 5:02 |
|  | Who Cleans Up When a Wind Farm Retires? | Inside Energy - Length 5:36 |
|  | How Big Can Wind Turbines Get? | Real Engineering - Length 13:49 |
|  | Solar with Storage: The Basics | Energy Queensland - Length 1:41 |
|  | How Solar Panels Are Made | Vision - Length 6:17 |
|  | What If the Ocean was Covered with Solar Panels? | Unveiled - Length 7:55 |
|  | What If All Houses Were Covered With Solar Panels? | What If - Length 4:40 |
|  | How solar energy got so cheap, and why it's not everywhere (yet) | DW Planet A (German TV station) - Length 7:53 |
|  | The Future Of Energy Storage Beyond Lithium Ion | CNBC - Length 14:21 |
|  | Next-Generation Inverters Enable Solar Energy Integration | US Department of Energy - Length 2:11 |
|  | How Australia's Most Powerful \$16 Billion Solar Power Plant Will Power Singapore | Innovative Techs - Length 6:26 |

Innovation Project Resources













More White Energy Journey Resources

| | | |
|---|---|---|
|  | The Glaring Engineering Mistake That Made Wind Turbines Inefficient | Discovery UK - Length 7:46 |
|  | 8 Inventions and Technologies that will Change our World! | Innovative Techs - Length 7:56 - reviews innovative energy designs |
|  | The Future of Solid State Wind Energy - No More Blades | Undecided with Matt Ferrell - Length 12:30 |
|  | AGRIVOLTAICS: Sustainable Farming Systems | College of Agricultural Sciences at Oregon State University - Length 4:45 |
|  | #betd2020 Documentary: Integrated PV - The Future of Solar | Berlin Energy Transition Dialogue - Length 10:33 |
|  | Why renewables can't save the planet | Michael Shellenberger TEDxDanubia - Length 17:32 |



Blue Energy Journey Resources

| | | |
|---|--|--|
|  | Portable Water Turbine that Charges Phones | HENRY FORD Museum – Length 2:30 |
|  | The journey of hydropower: How energy moves from nature to your home | Bonneville Power based in Portland -- Length 14:01 |
|  | World's Largest Batteries - (Pumped Storage) | Practical Engineering - Length 9:12 |
|  | Pumped Hydropower | Energy Storage Association |
|  | Pumped Hydro Storage | GE Renewable Energy |
|  | A review of pumped hydro energy storage | Progress in Energy |
|  | Open or Closed: Pumped Storage Hydropower is on the Rise | Pacific Northwest National Laboratory |
|  | Hydroelectric Power: How it Works | United States Geological Survey |
|  | How Hydroelectric Power Works | Tennessee Valley Authority |
|  | Glen Canyon Dam | U.S. Bureau of Reclamation |






Renewable Energy Resources (White and Blue Energy Journeys)
















| | | |
|---|--|---|
|  | Renewable energy lessons | LEGO Education |
|  | The 2030 Decarbonization Challenge Deloitte US | Article about reducing carbon emissions |
|  | Energy Basics | National Renewable Energy Laboratory |

Innovation Project Resources



| Renewable Energy Resources (White and Blue Energy Journeys) | | |
|---|--|--------------------------------------|
|  | Energy Basics | National Renewable Energy Laboratory |
|  | How does renewable energy work? Solar, Wind & Wave power Explained | LEGO - Length 9:21 |
|  | Renewable Energy Explained in 2 1/2 Minutes | Dane Bliss Design - Length 2:30 |







| Yellow Energy Journey Resources | | |
|---|--|--|
|  | Air Quality and Energy Choice STEM Activities for Educators | United States Environment Protection Agency |
|  | Alternative Fuels Used in Transportation (5 Activities) | US Department of Energy |
|  | What is a Hybrid Car and How Do They Work? | Car and Driver |
|  | How Do Hybrid Electric Cars Work? | US Department of Energy |
|  | What Are The Disadvantages Of A Hybrid Car? | J. D. Power |
|  | The new use for abandoned oil rigs | BBC |
|  | The Orange County Oil Spill. Everything We Know So Far | the LAist |
|  | How much would it cost to shut down an offshore oil well in California? Who pays? | LA Times |
|  | The Basics of Offshore Oil & GAS | National Ocean Industries Association – NOIA |
|  | STEM Classroom Activities & Resources | Shell |
|  | Answer Geek: How Gas Pumps Sense Full Tank | ABC News |
|  | Energy Safe Kids | Activities, info, lesson plans about safety around natural gas |
|  | Oil Platform vs Super Typhoon: Weathering the Storm from Korea to the Gulf of Mexico | Shell - Length 11:55 |
|  | The future of gas stations: Do EVs dismantle local pumps? | Road Show by CNET article and video |
|  | Fossil Fuels 101 | Fossil Fuels 101 from Student Energy - Length 2:42 |
|  | What's next for oil? CNBC Explains | CNBC - Length 3:32 |




Innovation Project Resources



Orange Energy Journey Resources






| | | |
|---|--|---|
|  | The Smart Grid | US Department of Energy Office of Electricity |
|  | The batteries that could make fossil fuels obsolete | Article from BBC |
|  | Driving to Combat Climate Change | Amazon |
|  | The new 'gold rush' for green lithium | Article from BBC |
|  | Texas's power disaster is a warning sign for the US | Vox - Length 7:05 |
|  | The Smart Grid Explained - An Understanding for Everyone | EPCE (Energy Providers Coalition for Education) - Length 3:00 - From 2011 |
|  | Why Aren't All Batteries Rechargeable? | Seeker - Length 4:23 |
|  | How The U.S. Can Build A 100% Clean Grid | CNBC - Length 19:01 |


Other Energy Sources







| | | |
|---|--|--|
|  | Energy Harvesting: Pavegen and the Rise of Kinetic Tile Tech | The Switch UK |
|  | Bioenergy: America's Energy Future | US Department of Energy - Length 15:00 – from 2014 |
|  | How Rotting Vegetables Make Electricity World Wide Waste | Business Insider - Length 5:31 |
|  | How Gasification Turns Waste Into Energy | CNBC - Length 15:45 |



Event Preparation Resources







| Official Event Resources from <i>FIRST</i> | | |
|---|--|--|
|  | Events Page | Firstlegoleague.org |
|  | Judging Session Flow Chart, Rubrics, and Awards List | Challenge Season Resources page |
|  | Team Meeting Guide | Reference pages 34-35 |
|  | Event Hub | Contact your local Program Delivery Partner to find out if you will be using the Event Hub in your region. |
|  | Robot Game Video Recording Tutorial | Tips and instructions for recording for remote events |

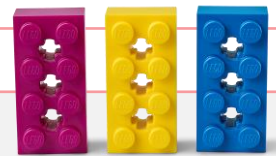
| Event Preparation Resources | | |
|---|--|---|
|  | Tournament Tips | Droid Robotics |
|  | Tips from Core Values Judges Tips from Innovation Project Judges Tips from Robot Design Judges | Droid Robotics |
|  | FAQ: <i>FIRST</i> LEGO League Challenge | Wisconsin <i>FIRST</i> LEGO League – confirm with your local Program Delivery Partner details about your local events |
|  | FIRST LEGO League Notebooks | Kiersten, a Nebraska <i>FIRST</i> LEGO League alumni – Length 13:55 |
|  | Getting Started with <i>FIRST</i> LEGO League Challenge - the Tournament Experience | IET (<i>FIRST</i> LEGO League Program Delivery Partner in the UK) – Length 1:55 – from the 2020 PLAYMAKERS season |

| Past Event Videos: Experience the sights and sounds of a <i>FIRST</i> LEGO League tournament | | |
|--|--|--|
|  | FIRST Championship Houston - <i>FIRST</i> LEGO League | <i>FIRST</i> – Length 1:14 – from 2019 |
|  | IET <i>FIRST</i> LEGO League UK & Ireland Final 2019: Event Highlights | IET (<i>FIRST</i> LEGO League Program Delivery Partner in the UK) – Length 1:37 |
|  | UND Hosted the <i>FIRST</i> LEGO League State Championship | University of North Dakota – Length 0:59 – From 2018 |
|  | FIRST LEGO League RGV Robotics Championship 2019 | <i>FIRST</i> Rio Grande Valley – Length 1:36 |
|  | NorCal FLL Challenge RePLAY Season Remote Qualifier Tournaments | Playing at Learning – Length 2:13 |
|  | FIRST LEGO League WA - a team's perspective | Curtin University, Perth, Australia – Length 3:38 |












Career Resources

General Career Resources

| | | |
|---|--|-----------------------------------|
|  | Visit the Learning Lab and search careers from A-Z | PBS LearningMedia |
|  | Amazon Future Engineer Class Chat | Amazon |
|  | Career One Stop – Pathways to Career Success | United States Department of Labor |
|  | O*NET OnLine | United States Department of Labor |
|  | O*NET Interest Profiler | United States Department of Labor |
|  | Career Exploration Lesson Plans | Nebraska Department of Education |

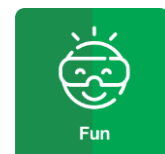
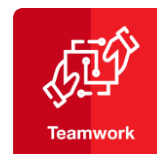
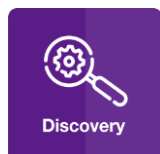
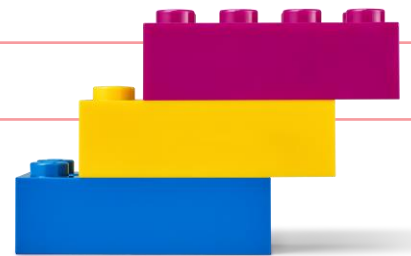


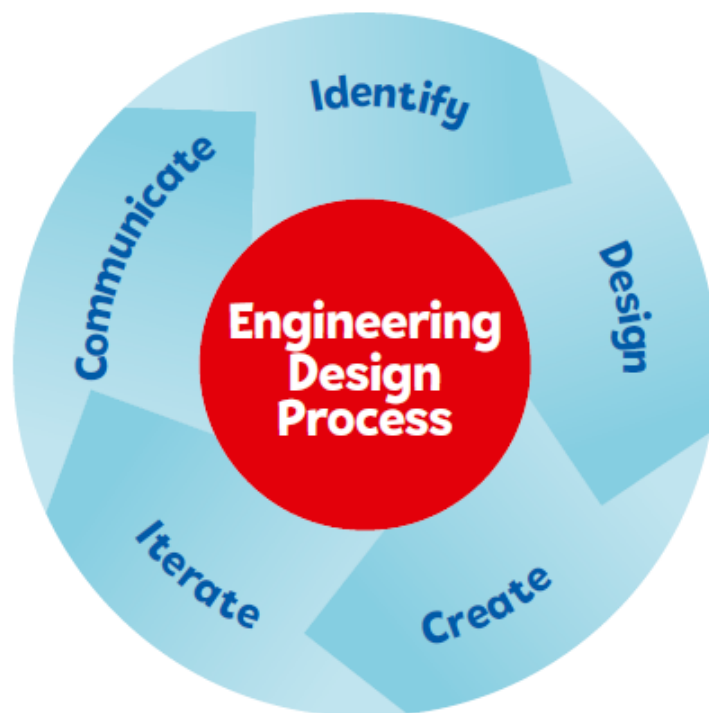
Energy Career Resources

| | | |
|---|--|--|
|  | The Office of Energy Efficiency and Renewable Energy Career Resources | United States Department of Energy |
|  | Energy Career Clusters | Minnesota State Careerwise |
|  | Get into Energy | Center for Workforce Development |
|  | Energy Careers | CareerOneStop - Length 2:07 |
|  | Renewable Energy Engineering Jobs: My Education and Career Path as a Mechanical Engineer | Engineering with Rosie - Length 8:09 |
|  | A Day In The Life Of A Wind Turbine Engineer | Broadcast Media Services - Length 5:55 |
|  | Energizing Careers at Consumers Energy | Consumers Energy - Length 3:57 |
|  | Day In The Life of a Lineman | Community Electric Cooperative - Length 6:27 |
|  | Women in Energy | RTI International – Length 3:31 |
|  | Women at Imperial: Inspiring women in the energy sector | Energy Futures Lab – Length 3:31 |
|  | Get Energised: Careers in renewable energy | National Museums Scotland - Length 3:08 |

Additional Resources

| Extension Activity Resources | | |
|---|--|---|
|  | <u>FIRST@Home</u> | These free activities supplement the <i>FIRST</i> season materials. |
|  | <u>What is a Robot?</u> | Lesson plan from PBS Learning Media |
|  | <u>Wild-Inspired Robotic Arms</u> | Video, background reading, and lesson plan from PBS Learning Media |
|  | <u>Evaluating Legitimate Sources</u> | Lesson Plan from Common Sense Media |
|  | <u>Engineering for Good</u> | Project-based Unit from PBS Learning Media |
|  | <u>Project Management Fiction Books for Youth Ages 10-12</u> | Project Management Institute Educational Foundation |
|  | <u>Invent It, Build It</u> | Lesson plan from PBS Kids |
|  | <u>Invention Education Curricula</u> | Links to invention-focused lesson plans from Invent Ed |
|  | <u>Books on Inventors</u> | Inventive Kids |
|  | <u>Drawing Designs in Detail</u> | Hands-on activity plan from teachengineering.org |
|  | <u>Energy Transfer Lesson for Kids Sound, Light & Heat, Grades 3-5</u> | Lesson Plan from Generation Genius |
|  | <u>Windmill STEM Challenge – The Boy Who Harnessed The Wind</u> | Activity about wind power for Teams with book link |
|  | <u>The Sustainable Transportation Lesson Package</u> | Learning for Sustainable Future |
|  | <u>Behind the Scenes Tour of Robotics at an Amazon Fulfillment Center</u> | Amazon |
|  | <u>Human and Robots Working together</u> | Amazon |





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