

The exploration of the Challenge theme and the development of a research project is a critical part of the overall FLL experience. FLL is not just about building and competing with robots. *FIRST* encourages well-rounded teams because any successful engineering project requires a wide variety of skills.

Through the project research, teams learn more about the science behind the Challenge theme and better understand the work of professionals in that field. Teams will encounter challenges similar to those faced by scientists and engineers as they identify a problem and develop an innovative solution. Exposure to these fields of science and related professions open kids' eyes to future career choices where they can make a positive difference to society.

Note: In order to be eligible for project awards at qualifying and championship tournaments, your presentation must explain how you completed *all three parts* of the project: *identify* a problem, *create* a solution, *share*

Consult the Project Rubric in the *FIRST LEGO League Coaches' Handbook* for more information. The total length of your project presentation should be no more than five minutes, including any set-up time.

The Project

Weather is the condition of the atmosphere measured in short lengths of time (hours and days). Climate, however, is the average weather over decades and centuries in a specific location. We can look out our window and see how weather changes every day, but we need data that has been tracked over hundreds of years to understand how the climate may be changing.

Climate tracking is important to communities around the world because the information is used to plan, predict, and make decisions on activities like planting crops or hunting and fishing. People also use data to anticipate the impacts of climate on the economy, food and water availability, tourism, disease control, and many environmental issues.

Why is climate important to us? By gaining a greater understanding of the Earth's complex climate systems, we will be able to work together now and in the future to develop the innovative solutions that will benefit us all and continue to improve the world in which we live.

Can FLL teams make the necessary Climate Connections?

1. Research how climate affects your own community. *Identify* a problem caused by climate in your area, analyze climate data about the problem, and discover what your community is doing about it. *Find* another community somewhere in the world with the same issue and identify any solutions they are working on.

Discuss the various ways climate impacts your community and your lives. Look at climate data available for your area as it relates to your climate problem. Consider talking with experts who work in a climate-related profession every day, such as climatologists, farmers, foresters, and community leaders. Then find another community in a different geographical area that is experiencing a similar problem. *Consult the FLL Topic Guide for additional project resources.*

2. Create an innovative solution based on the information you gathered. See if others, on a local or even global level, could use your innovation to solve this climate related problem or improve on an existing solution.

Consider all the potential solutions to your problem and how great an impact you can have. Talk with experts to see what ideas are already being developed or used. Build your climate connections by creating an innovative solution for your chosen climate problem that could be applied in both communities and adopted by even more communities who face a similar issue.

3. Share your research and solution. Once you have researched and developed your idea, get out there and share it! Take what you have learned to build awareness of the problem and promote your solution, highlighting your research. Use this project to see just how great an impact you can have on your community and your world!

These resources are intended to help you with your FLL project. If you choose to refer to them, the following guides and activities are resources readily available to help you complete your project. Your team will enjoy finding many other resources on its own, so you can consider these a starting point to help get your team going.

- [Glossary of Common Terms for Climate Connections](#) (pdf), [Project How-To Guide](#) (pdf)

The exploration of the Challenge Project is critical to the overall FLL experience. FLL is not just about building and competing with robots. *FIRST* encourages well-rounded teams. This document will help your team break the project down into smaller, more manageable parts to get started.

- [Talking with Experts – Preparation Ideas and Sample Interview Questions](#) (pdf)

Talking with experts who work in the field of the Challenge theme is a great way for your FLL team to learn more about the topic, find out current data, discover potential problems, and learn what is being done about those problems. This guide will help you get started.

Challenge-Related Activities & Information

These pages will provide your team with additional information and activities that relate to Climate Connections. Use them to supplement and/or jump-start your project research.

Print individual activities and info sheets by selecting from the list of pdf's below:

- [Levee building activity](#) , [Glacier melting activity](#) , [Carbon Sequestration](#) , [Ice cores and Ice Buoys](#) , [Atmospheric CO2 levels activity](#)

We have also collected a number of activities and lesson plans available online this year. [Resources for teachers](#)

Web Resources (see <http://firstlegoleague.org/community/fll/project.aspx> to access links)

There are an infinite number of web resources available to teams. Rather than attempt to provide them all, we have selected some and have provided search terms you might use to find sites of your own. The following links are intended to help you get started.

We highly recommend searching for web sites, books, magazines, and other sources of information that apply directly to your project topic. Successful teams will gather information from a wide variety of sources. Don't forget to visit your public library!

Fun & Interactive Sites

- Climate change game from the BBC
- Earth Day Footprint Quiz - an interesting activity for kids to try on their global footprint
- EPA Global Warming Kids Site: Focuses on science and impacts of global warming or climate change and on actions that help address global warming
- General information about climate and weather
- Climate Change Club Web site from the conservation corps of Newfoundland and Labrador
- Game from IBM and TryScience/NY Hall of Science
- A site created by WGBH about green living and sustainability
- An article about how making decisions that reduce your carbon footprint is a great way for kids to get involved in reducing the impacts of climate change
- *Search terms:* climate plus anything from the glossary of terms, plus carbon footprint, data, game, kids

Climate Change Skepticism

- List of climate change skeptics
- Article about a recent conference
- A site encouraging debate and discussion about climate
- *Search terms:* climate plus skeptics, global warming, climate change

Scientists & Their Research

- Byrd Polar Research Center - studies of various ice core drilling expeditions around the world
- Notes from the field – a polar scientist talks about a research mission he participated in
- Julie Brigham-Grette (2008 FLL Game Challenge Consultant) shares information about her career and research
- NASA's Jet Propulsion Lab Polar Playground Ice Buoy: The Argos Buoy is shown on deformed seasonal sea ice in the Weddell Sea
- A great resource including the science around climate change, the impact, and solutions
- Links climate change to energy consumption
- What is Causing the Dramatic Decline in Honeybee Populations in the U.S. & Elsewhere in Recent Years?
- Access to a wealth of Earth science data sets.
- *Search terms:* climate plus habitat, data, migration patterns, research, scientists

Climate Data, Governments, & Policy

- Find climate data
- Learn more about the concepts of latitude and longitude and find locations around the world
- Climate data from around the U.S.
- Site from Environment Canada includes a report on the status of emissions and plans to curb them
- The Intergovernmental Panel on Climate Change is the Nobel winning, international collaboration that has objectively studied and reported on all aspects of climate change.
- The NASA Earth Observatory includes data, images, experiments, missions, and much more.
- EPA's Climate Change Page: This is a wide-ranging overview of climate change, from science to policy.
- *Search terms:* climate plus policy, data, government, collaboration