FLL
FIRST LEGO® League

Pre-Tournament Information Packet

Project Judge

- 10 Things to Know as an FLL Judge
- Project Rubric
- Project Sample Questions
- Climate Connections Project Assignment
- Climate Connections Project Resources
- Event Schedule
- Awards Descriptions

CLIMATE CONNECTIONS

Thank you for agreeing to be a judge with *FIRST* LEGO® League. The information in this packet is designed to help you prepare as an FLL Judge this season. It serves as a supplement to the FLL Judges' Handbook and is intended to offer background information that will be useful to review prior to your tournament. You should also participate in training sessions that may be offered through your local tournament organizer and/or FLL. We hope your experience as an FLL Judge is rewarding and enjoyable!
Additional information can be found at:
www.firstlegoleague.org

Top 10 Things to Know About FLL Judging

10. Have fun – you and the kids
The most important thing to know about an FLL tournament is that it is supposed to be **FUN**. The mission of *FIRST* is to get kids excited about science and technology. A competition is a celebration of what the children have accomplished throughout the season. It should be serious and competitive, but not so much that the fun is lost.

9. Exhibit Gracious Professionalism and honor FLL Core Values
These are the basic foundations of *FIRST* LEGO® League, and should always be at the forefront in everyone's minds.

8. Be a good role model for technology and engineering careers
Give the kids a chance to see what makes engineers, scientists, computer programmers and educators special. Share your experiences without sharing your agendas. Be professional – show the kids that what they have accomplished is appreciated and valuable. Show interest in their presentations and discussions, and be personable.

7. Respect the children
Please keep negative comments to yourself, away from the ears of the kids, parents, and coaches. All teams should be given the benefit of the doubt when questions arise about adult involvement. If you suspect the kids did not do the work, it is your job to probe further to prove it, rather than assuming that the kids did not do the work. Remember that these are kids who worked hard all season to make it to the tournament. Treat their accomplishments with respect, and be sure that other judges do so as well. One negative comment from a judge can have a devastating effect on teams. Make it your goal as a judge to ensure that the teams know what they did well, and that they have a positive experience showcasing their achievements.

6. Respect the judging process
Stay on schedule. The kids have a more challenging schedule than you do. Remember the FLL awards philosophy. Remember that the whole judging process is subjective. Concentrate on providing a great experience for the kids and try not to get caught up in the mechanics of the process. Do not share scores or awards discussions with the kids, coaches or parents.

5. Evaluate teams completely and fairly
Each rubric is designed to evaluate many areas of a team's performance, and gives equal weighting to several factors. All factors are of equal importance. Be objective, both on a team-by-team basis and a total rubric evaluation basis. Familiarize yourself with the levels of achievement. Identify any conflicts of interest you have before the competition, and refrain from involving yourself in discussions about any team when you have a conflict.

4. Consider age appropriateness and experience
Consider age when evaluating teams. Certain skills, knowledge, and capabilities are more likely to be exhibited by the kids as they get older and more experienced in general and in FLL in particular. You may also see rookie teams that are more polished and understand FLL better than experienced teams.

3. Reward excellence and celebrate achievement
For a team to be considered for an award, they should be evaluated at an Excellent level of achievement in that category whenever possible. Award distribution is spread as equitably as possible among the teams, with the goal of no team winning more than one award.

2. Provide specific and constructive feedback
Please be specific when providing feedback comments to teams. This will also help when it comes to awards deliberations – specific examples are very helpful when differentiating between teams. "This team's willingness to help other teams (by providing programming mentorship, for example) is exemplary" is more descriptive and helpful than "that team was so nice and polite and exhibited gracious professionalism." Take lots of notes if you need to!

1. See #1 again!

FLL Team Number _____

FLL Team Name _____

Project Rubric

	Needs Improvement	**Fair**	**Good**	**Excellent**
Research	** No clearly defined research problem or it does not relate to the *FLL* theme	Research problem is vague or relates poorly to *FLL* theme	Research problem is fairly clear and concise, and relates fairly well with *FLL* theme	Research problem is explained clearly and concisely, integrates well with *FLL* theme
	No outside sources used in research	Limited outside sources used in research or few mentioned	Cited a diverse variety of outside sources used in research	Cited multiple sources used in research including communication with a professional(s) (or attempts to)
	No research on the impact of the problem	Limited research on the impact of the problem	Impact of problem clearly researched	Impact of problem thoroughly examined and applied to solution
	No research on existing solutions or technologies used to address the problem	Limited research on existing solutions or technologies used to address the problem	Present solutions and technologies clearly researched but not considered in developing solution	Clearly researched existing solutions and technologies, applied knowledge when developing solution
	Alternative theories or interpretations ignored, no clear arguments	Alternative theories or interpretations dismissed and/or arguments obscured by jargon	Considered alternative theories or interpretations and presented clear arguments	Alternative theories or interpretations presented and addressed in persuasive arguments
	Did not demonstrate understanding of technical terms	Demonstrated a limited understanding of technical terms	Demonstrated understanding of technical terms but didn't explain them clearly	Demonstrated and shared a complete understanding of technical terms
Innovative Solution	** No solution presented	Solution is unclear	Solution is described but not clear how it addresses the problem	Solution is concisely described and clearly addresses the problem
	No data presented in support of proposed solution	Weak or limited data to support proposed solution	Adequate data supports proposed solution	Substantial data supports proposed solution
	Solution is not innovative or new	Solution is somewhat innovative, or limited knowledge of science and/or technology applied	Solution is innovative and applies some knowledge of science and/or technology	Solution is innovative and applies knowledge of science and/or technology
Sharing	** Did not share their project, research or solution with anyone outside team	Shared their project, research or solution with team parents	Shared their project, research or solution with others beyond parents such as a class, sponsors or other teams	Shared their project, research and solution with others such as their school, community or experts in their field
	Did not consider how their problem and/or solution might impact themselves or consider what changes to make	Considered how this might impact themselves or their family, but did not consider changes	Considered how this might impact themselves and their family and recommended changes	Considered how this impacts others and implemented a plan to produce change

FLL Team Number _____

FLL Team Name _____

Project Rubric

	Needs Improvement	Fair	Good	Excellent
Creative Presentation	Presentation rambles	Presentation organization is weak	Presentation organization is clear, integration and/or logical progression could be improved	Organized presentation with clear beginning, middle and end; well-integrated; logical progression
	Limited number of team members participated in project presentation	Less than half of the team participated	Most of the team participated in the presentation	All or almost all team members participated
	Unable to answer judges' questions	Weak answers to judges' questions	Adequate answers to judges' questions	Comprehensive answers to judges' questions
	Team member ideas were not integrated	Team member ideas not well-integrated	Project is a group effort	Collaboration of group is seamless
	No visual aids or support material	Ineffective visual aids or weak support material	Visual aids or support material complement presentation	Carefully chosen visual aids and/or support material clearly add to presentation
	Lacks excitement or creativity	Information presented with limited creativity	Team uses creativity doing presentation	Excellent use of creativity
	Excessive adult intervention	Adult intervention is apparent	No apparent adult intervention but difficulty with set up/take down within allotted time	Clearly the work of the children from beginning to end including all visual aids and material
	Many errors or not rehearsed	Few errors or should have rehearsed more	Very few evident errors, well rehearsed	No evident errors and well rehearsed
	Too long	Slightly too long	Proper length	Excellent use of time
	Plagued with technical difficulties	Several technical difficulties	Very minor technical difficulties	No technical difficulties

**   If any of these boxes are checked, team is not eligible to be considered for any Project awards. Team must complete all elements of the Challenge Project assignment to be considered for Project awards.

Project Presentation Sample Questions

Research Quality

- What resources did you use to research your problem and why did you choose these?
- Did you use any unusual methods to research your topic? If so what and why?
- Did the information you used offer different ideas than what you expected to find? If so, what and how did your team use this information?
- Did you speak to anyone who works with climate? What did you learn from them?
- Can you tell us about a problem you discovered or something that you learned that surprised you while completing this project?
- After working on this project, what is the most important thing that your team learned?

Innovative Solution

- What makes your solution different from what is being used to solve this problem now, and why do you think it is better?
- How did you arrive at your solution and why?
- Were there solutions that you thought of that you decided not to use? Why?

Project Sharing

- With whom did you share your project? Why did you choose that individual or group?
- How did you share the information? Did you present it in the same manner as you presented to us, or did you choose a different approach? Why?
- What impact did your presentation have on them?
- What changes have you or others made as a result of your research and presentation?

Creative Presentation

- How did you decide on this presentation style that you used?
- Why did you choose the presentation style that you chose? How does this style help your audience understand what you are telling them?
- What do you think was the most creative aspect of your presentation or project and why?
- One aspect of the project asked you to share your ideas with others. How did your team do this?

Look for:

- Documentation of resources used.
- Depth of the information provided.
- All students participated in the research process, or understand the process and results of the team's research.
- Higher achieving teams will provide supporting printed materials to judges.
- Entire team participating in discussion.
- How the team interacts with each other.
- Do they all talk, or only a few? If so, why?
- Does the team look to the coach often or are they focused on the presentation and judges.

FIRST LEGO® League Project

NOTE: In order to be eligible for project awards at qualifying and championship tournaments, you must explain in your presentation how you completed all THREE parts of the project (**identify** a problem, **create** a solution, and **share**). Consult the Project Rubric in the FLL Coach's Handbook for more information. The total length of your project presentation should be no more than five minutes, including any setup time.

Project Introduction

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?

The Project

1.) **Research** how climate affects your own community. **Identify** a problem related to 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 with or in climate everyday, like 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 that could be used on a local or even global level to solve this climate problem or improve on an existing solution.

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

3.) **Share** your research and solution.

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

Glossary of Terms

Albedo:

The measure of the amount of sun reflected off the Earth's surface. High albedo means there is lots of reflectivity, which occurs off of snow and ice. Low albedo means that much of the sun's rays are absorbed by the surface, which occurs with water.

From http://eobglossary.gsfc.nasa.gov/Library/glossary.php3?mode=all
The ratio of the outgoing solar radiation reflected by an object to the incoming solar radiation incident upon it.

Atmosphere:

The thin layer of gases that surround the Earth and help regulate temperature.

From http://dictionary.reference.com/browse/atmosphere
The gaseous envelope surrounding the earth; the air

Barometer:

From http://www.answers.com/topic/barometer?cat=technology
An instrument for measuring atmospheric pressure, used especially in weather forecasting

Biosphere:

From http://www.visionlearning.com/library/pop_glossary_term.php?oid=
The part of the world in which life can exist

Carbon Dioxide:

A gas that is exhaled by humans and absorbed by plants during photosynthesis.   It is also emitted when fossil fuels are burned.

From http://ans.engr.wisc.edu/eic/UsefulTerms.html
A heavy colorless gas that does not support combustion, and is primarily formed by animal respiration and combustion of fossil fuels. It is essential for life because plants absorb it from the air by photosynthesis. Also known as CO_2.

Climate:

The average weather in a certain area that occurs over a long period of time

From http://www.merriam-webster.com/dictionary/climate
1**:** a region of the earth having specified climatic conditions 2 a**:** the average course or condition of the weather at a place usually over a period of years as exhibited by temperature, wind velocity, and precipitation

Climate Feedback:

The interaction of climate processes: one process triggers changes in another process that eventually leads back to the original process. Positive feedback reinforces and intensifies the process while negative feedback reduces it and brings it towards balance. Often there is a long lag time, or delay, between when the change is triggered and when we see the effects.

From http://encarta.msn.com/dictionary_561538421/climate_feedback.html
An atmospheric, oceanic, or terrestrial process brought about as a direct result of changes in the energy balance between incoming solar radiation and outgoing infrared radiation from the Earth

Climatologist:
> A person who studies climate and its effects on the Earth and its systems

> *From http://www.sensesofwildness.com/africa/GLOSSARY.HTM*
> A scientist who studies the Earth's climate

Drifting Buoy (or Ice Buoy):
> An instrument placed in the water or on a block of ice to measure weather and climate indicators and send the information back to data collection centers.

> *From http://nsidc.org/arcticmet/glossary/drifting_buoy.html*
> Floating (or drifting on ice) ocean buoy equipped with meteorological and/or oceanographic sensing instruments linked to transmitting equipment for sending the observed data to collecting centers.

Ecosystem:
> *From http://www.ifdn.com/teacher/glossary.htm#e*
> A system made up of a community of animals, plants, and bacteria and its interrelated physical and chemical environment

Environment:
> *From http://www.doe.mass.edu/frameworks/scitech/2001/resources/glossary.html*
> The complex of physical, chemical, and biotic factors (as climate, soil, and living things) that act upon an organism or an ecological community and ultimately determine its form and survival.

Ice Core:
> *From http://www.greenfacts.org/glossary/ghi/ice-core.htm*
> Cylinders of ice obtained by drilling into a glacier. Since the different layers of ice are formed over time through build-up of snow, ice cores provide information on climate from different periods (up to almost one million years) that can be used for research.

Latitude:
> Latitude lines are imaginary horizontal lines that circle around the Earth and measure distance from the equator.

> *From http://usinfo.state.gov/products/pubs/geography/glossary.htm*
> A measure of distance north or south of the equator. One degree of latitude equals approximately 110 kilometers (69 miles).

Levee:
> *From http://www.merriam-webster.com/dictionary/levee*
> An embankment for preventing flooding

Longitude:
> Longitude lines are imaginary vertical lines that run from the North to South Pole and measure distance from the Prime Meridian.

> *From http://usinfo.state.gov/products/pubs/geography/glossary.htm*
> A measure of distance east and west of a line drawn between the North and South Poles and passing through the Royal Observatory at Greenwich, England

Meteorologist:
> A person who studies weather and makes forecasts on weather patterns

A person who studies the science that deals with the atmosphere and its phenomena and especially with weather and weather forecasting

Migrate:
1. to go from one country, region, or place to another 2. to pass periodically from one region or climate to another, as do certain birds, fishes, and animals

Precipitation:
A deposit on the earth of hail, mist, rain, sleet, or snow; also the quantity of water deposited.

Seasons:
A time of the year identified by a specific climate (i.e. winter, spring, summer, or fall).

Climatic changes caused by the position of the earth relative to the sun. The temperate zones have four seasons and the tropics two.

Sequestration:
The separation of carbon from the atmosphere

The capture of atmospheric carbon dioxide in a solid material (such as growing trees, other vegetation, and soils) or a carbon sink through biological or physical processes, such as photosynthesis.

Sustainability:
The ability to last over the long-term. A process is sustainable if it can be done over and over again with little or no need for change or modification.

The ability to provide for the needs of the world's current population without damaging the ability of future generations to provide for themselves. When a process is sustainable, it can be carried out over and over without negative environmental effects or impossibly high costs to anyone involved.

Weather:
Atmospheric conditions at a certain place and time. Weather is measured in shorter lengths of time like hours and days.

The state of the atmosphere at some place and time described in terms of such variables as temperature, cloudiness, precipitation and wind.

Project How-To Guide

NOTE: Chapter 5 of the FLL Coaches' Handbook (4th Edition) has additional resources about completing the project.

Why a Project?

The exploration of the FLL project is critical to the overall Challenge experience. FLL is not just about building and competing with robots. It is about making connections between the robot missions, our scientific understanding of the Challenge theme, related problems and innovative solutions.

FIRST encourages its teams to be well-rounded. Any successful engineering or technology project requires a wide variety of skills and abilities. For example, the Mars Rovers would not have been as successful if the NASA team working on them did not have people who know about the climate and terrain the robots would face on Mars working with the designers and engineers.

Before getting started on this year's project, we highly recommend that your whole team watch the Challenge Project Training DVD. Keep in mind, however, that the steps of the project have shifted since the DVD was developed. Therefore it is essential to refer to the project assignment and kickoff material posted on the FLL website for the most up-to-date information about the project.

Getting Started

Specific instructions for this year's project will be posted on the FLL website at kickoff. Generally the project has three steps:
- through research, identify a real world problem related to the Challenge theme,
- create an innovative solution,
- and share your research and solution with your community.

Read this year's project very carefully before getting started.

To qualify for awards your team needs to share all three steps of the project through a creative and informative presentation with judges at an FLL event.

Although the project may seem daunting at first, if you break it down into smaller parts it becomes more manageable. There is a sample schedule in Chapter 9 of the FLL Coaches' Handbook outlining how your team can complete the project over eight weeks.

The Specifics

Identify a real world problem

You can start to identify your team's focus for the project by:
1. Reading the assignment very carefully with your team. Allow team members to ask questions to clarify any parts that they do not understand.
2. Discussing the theme as a group and brainstorm some general ideas about the topic.

3. Choosing three or four main ideas and then break the team into small groups to research these ideas. A list of good sources of information is available at the end of this guide.
4. Coming back together as a team and sharing the results of the research.
5. Deciding which aspects of the research are the most important and/or relevant to the project. Rank the ideas by importance.

Create an innovative solution

Your team needs to agree on one unique solution to your problem. Innovative means the solution is not already in use by someone else. It can be a new idea or an improvement on an existing idea. To do this, you may want to develop ideas individually or in small groups and then present them to the team, or you may want to collaborate on an idea together. If starting separately, consider combining the strengths of several solutions to create a final solution.

1. Brainstorm ideas with your team
2. Begin to develop a variety of designs
3. Draw pictures of your proposed solutions and/or innovations to current solutions
4. Present each possible solution to the team
5. As a team, select one solution to focus on (this design may combine the strengths of several designs)
6. Come together as a team to improve upon your chosen solution
7. If it makes sense, build a prototype of your solution

Share your research and solution

This step is critical to completing the project and is not just about practicing your presentation. It is a chance for your project to make a difference. It is an opportunity to share the excitement of science and technology with others. This may even be an opportunity to motivate others to act.

1. Brainstorm who you can share your findings with such as your school, a governing group, a local company, a community organization, or other FLL teams. Think about who would be most interested in what you have learned and/or who might be able to use the information positively.
2. Select who you want to share your findings with and make arrangements for the presentation to be completed prior to developing your project presentation for your FLL event.
3. Organize and prioritize the information you want to share.

Deciding *what* to share with the judges

Since you have only five minutes for your project presentation at FLL events, you must carefully select the information you will include on the basis of:

- Importance to the project theme
- Aspects on which you have solid information and data.
- Information and data that relates closely to the problem you have focused on and innovative solution you have created.
- Material that fits your team's presentation style or format.
- Relevance to the three steps of this year's project.

Deciding *how* to share with the judges

In the final process of developing the presentation there are four major considerations:

- Showing how you achieved all project objectives and all three steps of the project.
- Selecting a creative format or style of presentation that complements your information and team member skills. (The options are broad, including but not limited to a discussion, formal presentation with props, skits, songs, music and/or video.)
- Using the project rubric found in the back of the current *FLL Coaches' Handbook*, as a guideline for what judges will look for and paying close attention to qualities listed in the excellent column.
- Setting a standard of quality. (See below how you can understand the FLL standard of quality for project presentations.)

Polish and *perfect*

Take some time to discuss the following suggestions as a team. This way, everyone understands what will help make the work easier and the end result more successful and fun.

1. Standard of Quality
   The best way for your team to understand the standard of quality for project presentations is to see some presentations. Some FLL tournaments allow team members and the public to view all project presentations. If this is true at your event, take advantage of it! At other FLL tournaments the best presentations are part of the closing ceremony. If so, pay attention!

   You can also ask another team to rehearse their presentation for you or watch the presentations available on the Challenge Project Training DVD. The Minnesota-based FLL organization called "High Tech Kids" provides examples of winning presentations from previous years at www.hightechkids.org

2. Understand and achieve the objectives.
   Past experience shows that the most successful projects and their presentations are guided by the FLL theme and project guidelines. The first step in developing your project, therefore, is a complete understanding of the theme and the guidelines for this year.

3. Involve the Community
   Your community is a very important source of support and help. Draw on members of your community for advice, resources, information and guidance. Community organizations will promote your team's involvement in the FLL project when you demonstrate mutual interests.

4. Survey team's talents
   This is your team's chance to shine! What can team members contribute to make the presentation special? Are any students interested in the arts … playing instruments, acting, singing or poetry? Do any have special technology talents regarding websites, video animation, etc? Start from these strengths and design your presentation around them.

5. Practice, Practice, Practice
   Finally, your practice sessions should also include questions and answers. You may want to consider inviting parents, teachers, or other students to view a dress rehearsal of your presentation. This critical audience can ask questions of the team, give feedback, and support the team by offering positive encouragement.

Sources of information

- Published sources, such as:
  - ❑ The FLL website includes a project guide each season with links to useful information and activities.
  - ❑ Libraries
  - ❑ Government agencies
- Knowledgeable people and organizations:
  - ❑ Scientists or professionals whose work relates to the theme. They may be local or contacted by phone, mail or email. Don't forget to check with team parents!
  - ❑ Community organizations with interest in the Challenge topic.
  - ❑ Universities and colleges that have experts in the field.
  - ❑ Corporations whose businesses relate to the theme.
  - ❑ High schools or other schools that teach these topics.
  - ❑ Tour a business related to the theme.

Keep in mind that knowledgeable people may come from all walks of life!

Web Resources

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
http://www.bbc.co.uk/sn/hottopics/climatechange/climate_challenge/

Earth Day Footprint Quiz - an interesting activity for kids to try on their global footprint
http://www.earthday.net/Footprint/index.asp

EPA Global Warming Kids Site: Focuses on science and impacts of global warming or climate change and on actions that help address global warming
http://epa.gov/climatechange/kids/index.html

General information about climate and weather
http://www.weatherwizkids.com/climate.htm

Climate Change Club Web site from the conservation corps of Newfoundland and Labrador
http://www.conservationcorps.nf.ca/ccc/index.html

Game from IBM and TryScience/NY Hall of Science
http://www.powerupthegame.org/

A site created by WGBH about green living and sustainability
http://www.meetthegreens.org/

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
http://www.timeforkids.com/TFK/kids/specials/articles/1,28285,1613313,00.html

Search terms: climate plus anything from the glossary of terms, plus carbon footprint, data, game, kids

Climate Change Skepticism

List of climate change skeptics
http://www.sourcewatch.org/index.php?title=Climate_change_skeptics

Article about a recent conference
http://www.realclimate.org/index.php/archives/2008/01/what-if-you-held-a-conference-and-no-real-scientists-came/

A site encouraging debate and discussion about climate
http://www.demanddebate.com/

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
http://bprc.osu.edu/Icecore/front-page.html

Notes from the field – a polar scientist talks about a research mission he participated in
http://www.mcgill.ca/reporter/40/07/notes/

Julie Brigham-Grette (2008 FLL Game Challenge Consultant) shares information about her career and research
http://www.geo.umass.edu/faculty/jbg

NASA's Jet Propulsion Lab Polar Playground Ice Buoy: The Argos Buoy is shown on deformed seasonal sea ice in the Weddell Sea
http://southport.jpl.nasa.gov/polar/toys.html

A great resource including the science around climate change, the impact, and solutions
http://www.davidsuzuki.org/Climate_Change/

Links climate change to energy consumption
http://www.iisd.org/climate/

What is Causing the Dramatic Decline in Honeybee Populations in the U.S. & Elsewhere in Recent Years?
http://www.organicconsumers.org/articles/article_5485.cfm

Access to a wealth of Earth science data sets.
http://viz.globe.gov

Search terms: climate plus habitat, data, migration patterns, research, scientists

Climate Data, Governments, & Policy

Find climate data
http://www.worldclimate.com/
http://outflux.net/weather/noaa/
http://www.BestPlaces.net/climate/

Learn more about the concepts of latitude and longitude and find locations around the world
http://www.socialstudiesforkids.com/subjects/latitudelongitude.htm

Climate data from around the U.S.
http://lwf.ncdc.noaa.gov/oa/climate/research/ushcn/ushcn.html

Site from Environment Canada includes a report on the status of emissions and plans to curb them
http://www.ec.gc.ca/climate/home-e.html

The Intergovernmental Panel on Climate Change is the Nobel winning, international collaboration that has objectively studied and reported on all aspects of climate change.
http://www.ipcc.ch/

The NASA Earth Observatory includes data, images, experiments, missions, and much more.
http://earthobservatory.nasa.gov/

EPA's Climate Change Page: This is a wide-ranging overview of climate change, from science to policy.
http://epa.gov/climatechange/index.html

Search terms: climate plus policy, data, government, collaboration

Talking with Experts –
Preparation Ideas and
Sample Interview Questions

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. Experts can include a variety of people like scientists, engineers, community leaders, university professors and students, and anyone whose life or work is affected by the Challenge theme.

Preparing for Your Interview

You should contact your expert well in advance to see if they are able and willing to help on your project. Find out their preferred way to conduct the interview (in person, over the phone, electronically). Set up a time and start getting ready for the interview.

Before the day of the interview, your team should prepare a list of questions. Plan for concise, to-the-point questions that will help you achieve your project goals and make the best use of your time with the expert. Try to anticipate how long it will take for all the questions and answers so you can keep the interview in the scheduled time length. Keep your questions to the topic of your specific presentation.

It is helpful to write down your questions and have them in front of you when you are interviewing. You may even consider sending a list of questions to your expert in advance so they can properly prepare. Decide ahead of time which team member(s) will ask each of the questions. Always remember to exhibit gracious professionalism during your interview and be respectful of the time given to you by the expert. Treat the expert like a member of your team and remember to thank them for their contribution!

Climate Connections Experts and Sample Questions

Climate Experts

Certain types of experts who work with or in climate everyday may be particularly helpful to talk with for your project. These may include:

- Climatologists
- Farmers
- Meteorologists
- Gardeners
- Entomologists
- Community Leaders
- Lawmakers
- Fishermen
- Landscapers
- Business owners

Research Questions

There are certain questions you should answer through research prior to interviewing any experts. These will help everyone on your team have an understanding of the basic project and challenge elements.

Some of these questions include:

- How do climate and weather differ?
- How do climate problems affect your life?
- What tools are used to measure climate and weather?
- What types of jobs are affected by climate and weather?
- What is the jet stream? How does it affect weather?
- What is the sunniest city in your country?   What city has the most rainfall each year?

Interview Questions

As your prepare for your interview, you will need to think of questions that specifically address the project topic your team has selected. However, some teams may talk to experts before selecting a specific problem and the questions below are a helpful guide to get you started.

Some *sample* interview questions include:

- How did you get into your career?
- Do you experience the effects of climate in your career? How so?
- What is the most important climate question facing our area?
- Do you know of any other areas in the world facing similar challenges caused by climate?
- How do you measure climate? Are there tools to do this?
- As a (farmer, fisherman, etc.), how is your job affected by the climate you live in?
- What effect does weather/climate have on your job?
- Do you think the climate is changing in our area?
- Do you believe that we need to reverse effects caused by climate change?
    - If so, can we reverse it and how would that be done?
- What types of living things are affected by climate (animals, plants etc?)
- What advice can you give the next generation in terms of fixing climate problems?
- Would planting trees have an effect on the climate of our area?