**Diving into Long Term Ecological Research**

**Introduction:**

The Long Term Ecological Research (LTER) Network is a series of research stations around the world. The LTER Network’s goal is to collect and make available research data from various ecosystems around the United States and Antarctica over long periods of time. Most grants from the National Science Foundation (NSF) are only for 3 years. The NSF established LTERs to ensure that ecological issues, such as the effects of climate change, could be consistently studied over decades. Your group will be analyzing some of this ecological data from an LTER ecosystem of your choice. You will present your findings to your classmates through a scientific poster.

Scientists often create posters to present their research to their colleagues at conferences in order to advertise their research and generate discussion. A scientific poster isn’t simply the scientific paper or article pasted on a board. It is summary of the research designed to provide the reader with a basic understanding of your research question, findings, conclusions and applications. As a result, you need to be thoughtful about the value of the information put on the poster. For example, tables of raw data do not provide the reader with a summary of your results. Data is better presented in figures and graphs where the data has been statistically analyzed. At the termination of the project, our class will have its own LTER conference where your group will present your poster to your classmates.

**Objectives:**

* Form a research question.
* Analyze real world data collected at a Long Term Ecological Research (LTER) site.
* Communicate your findings to your peers through a scientific poster.

**Getting Started:**

Go to the Long Term Ecological Data (LTER) Network website. <https://lternet.edu>

Click on the SITES tab towards the top of the website. This will take you to a list of the different LTER Sites. Your group will pick one of these sites to study. Click on each site to read the background about the site. There are various biomes represented. There are aquatic and terrestrial systems. There are urban and rural/natural sites. There are Arctic and Antarctic sites.

When you find a specific site that interests your group, let your teacher know. Click the Site Home Page Link in the Web Site Link Box on the right side of the page. Here you will find all the resources related to your site.

Once on your LTER site’s homepage, click on the data tab and explore the research being carried out at your LTER site. Each LTER site organizes its data in different ways, so you will need to take some time to explore your site’s data and website. You will need to download data sets to in order to establish your question. You may need to register at the site in order to download it.

Once you have explored the available data, you need to come up with a research question that can be supported by the available data. You may use more than one data set. Be sure to have your research question approved by the teacher before continuing.

Example of a Research Question:

How have changes in the amount of dissolved inorganic carbon (or carbon dioxide) in the seawater affected the growth of phytoplankton as measured in the amount of chlorophyll in the seawater at Palmer Station LTER in Antarctica?

Form a hypothesis based on your question. Analyze your appropriate data sets to determine if your hypothesis can be supported or refuted. Compile and analyze your data through annotated figures (tables and/or graphs). Use statistical methods to analyze your data, as appropriate. You will present your research to your classmates on a scientific poster using the poster design outline on the next page.

**Scientific Poster Design Outline**

You and your group will use a piece of regular size poster paper to design your poster. Be sure to follow the rubric for the poster.

**TITLE**

(The title should describe your research by presenting the relationship between the experimental variables)

**AUTHORS**

**Analysis**

Was your hypothesis supported or refuted? Be sure to support your answer with data.

Provide a possible scientific explanation for the results. Be sure to address any anomalies in your data.

How do your findings relate to the processes in the ecosystem including energy flow and nutrient cycling?

How might changes on the global level, such as climate change, affect your findings in your ecosystem?

**Data Source**

How was the data that you used to answer your question collected by the researchers?

Include written explanations and/or annotated illustrations of the sampling methods used.

**Results**

Present the data using hand drawn or computer generated graphs with properly labeled axes, a descriptive title and a key (as appropriate).

Include a written description of the major trends in the data.

**Introduction**

How would you describe your LTER site?

Provide background about your site including the following:

* coordinate location and size
* when it was established
* description of general abiotic and biotic factors of the ecosystem
* any major changes to your site (fires, melting etc.)
* Photographs and/or maps of the site

**Scientific Question**

What was your scientific question?

What was your hypothesis?

**Credit and Acknowledgements**

What sources did you use to conduct your research and develop your research question? Cite these sources using MLA format.