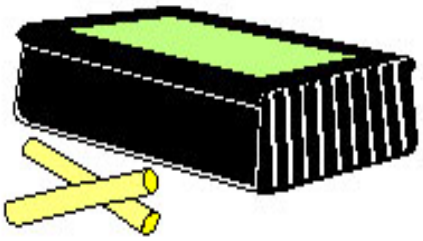
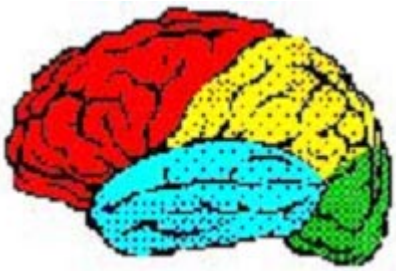
Teacher Information
Lesson Title: **Climate Change**



Lesson Description: The students will learn how to use the climate database on the Internet. This database has climate information from all over the world. The lesson guides students through comparisons of climate conditions for one area over the course of several years. It also encourages students to investigate other locations around the world and compare the climate changes to their own area. The lesson provides support materials fro the instructor to teach the necessary skills to the students ahead of time so that they can be successful once they are using the climate database.

Learning Outcomes:
The students will be able to:
- Explain the climate data base graphs
- Explain how the climate database works
- Locate two different places in the world and compare their climates for the same time periods
- Compare and contrast graphs for several different locations
- Explain what has been occurring within the climate index for their city over the last few years

Materials:
Lab worksheets
Overheads for the instructors use
3 different colored overhead markers



Activity 3:
LCD projector and computer connected to the Internet
Screen
Or
Computer lab for all the students (internet access)

Method: Follow the directions provided on the lab sheets

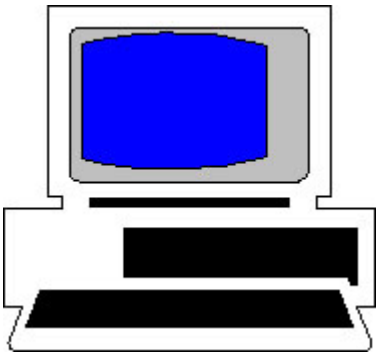
Time Requirements:
45 minutes per activity

MST standards: See the overview chart

Assessment: Every student will complete activity sheets and submit them for the instructor's assessment

Climate Change
Student Activity #1

Name _____
Date _____
Partner(s)_____



Introduction: In this activity you will be using your own knowledge of weather patterns, your classmate's knowledge and a climate index found on the Internet to help analyze climate change in _____.
(Location)

Pre Internet discussion:

1) What stands out in your mind regarding the weather for your location last year? (Ex. A colder than normal winter, a dryer than usual spring, etc.)

_____

_____

_____

2) In the chart below, list your thoughts about the year. Record in "your thoughts" column, cooler, warmer, normal or unsure, according to your ideas.

Season (State-By-State)	Your Thoughts	Classes Thoughts	Actual, Factual Occurrence Using the climate index
Winter			
Spring			
Summer			
Fall			

2B) Choose a person to record the classes' results for each of the seasons above. Every-one should record these findings on their own worksheets. _____

_____

_____

_____

3) Make some observations regarding the results of the two columns. (Did everyone think the same way?) _____

_____

_____

_____

Student Activity #2

Name: _____ Date: _____

Data Collection:
Directions: You will be using the Internet to acquire the data regarding average temperatures for different seasons for your State and Country.
Make sure you have an access or user number (check with your instructor) before you begin.

Directions:

____ 1) type in the website http://lwf.ncdc.noaa.gov/oa/climate/climateresources.html.
on the address bar and type in enter. You are now in the "Climate Index". This is a system that collects data regarding the weather from locations all over the world and keeps the data on file. It also calculates the average temperatures, according to the years listed. Take some time to explore the climate index.

_____ 2) To complete this worksheet, Click on "Research and Applications"

b) Click on the "Climate of 2002"

c) Click on "Climate at a glance"

The screen will show a map for the United States for the current months temperature and precipitation (wait long enough to see the map switch variables)

d) Scroll below the map and enter the desired month, year and click submit

e) Choose a month for each of the seasons and determine if New York State was warmer, cooler, or average by using this method.

_____ 3) Record your findings in the chart under question 2 on the first page. This information should complete that chart.

_____ 4) Complete the following table using your newly developed skills with the climate index and your partner(s) assistance. (You may want to divide up the task and assign each person a job and then compile your data as a group)

Time Period June-August 2001	Temp. Average = A Cooler = C Warmer = W		Precipitation > =Greater < = Less A = average	
Regional				
Northeast				
South				
West				
National				

Conclusions: Based on the completed chart above, make three conclusions regarding the data.

Extended Activity:
Climate Change in My City

Name _____

Date _____

Partners

_____
(teams of 3-5)

Task: Using the following website http://lwf.ncdc.noaa.gov/oa/climate/climateresources.html , the library and other resources; complete the following data worksheet with your partners and then make a 2-5 minute presentation in the form of a News Report or a Travel Promotional to present to another group of students. Note the rubric-scoring sheet that will be used to judge your presentation before you begin the process.

Data Work:
1) Region of the United States or country that you are investigating?

_____

_____

2) What is the temperature range for an average year for this location?

_____

_____

3) Describe this locations seasons, temperature, precipitation, wind patterns, etc.

_____

_____

4) List the latitude and longitudes for the area selected.

_____

_____

5) Notable factors effecting climate such as proximity to large bodies of water, mountain ranges, arid locations, wind patterns etc.

_____

_____

_____

6) Are there any warming or cooling trends for last year compared to this locations average temperature. Use the technique from the earlier worksheet.

_____

_____

_____

7) Other interesting climate, geological, astronomical factors regarding the area. (Please add more information on your own paper and feel free to add pictures, diagrams, graphs etc.)

_____

_____

_____

_____

RUBRIC (scoring for the extended activity: Climate Change in My City)

Teacher Guidelines:

1) Each student team of 3-5 people should complete their own factual worksheet to turn in to the instructor. They should be asked to keep all worksheets in their notebooks when they are returned. The data collection for the fact sheets can be completed by the team but each individual in the team should write out their own worksheet.

2) Each team should make a list of the tasks each person in the team will complete. The instructor will check the list and make modifications if needed so that individual strengths are highlighted and equality of work is demonstrated. This will be completed at the beginning of the project.

3) Before the presentations are made, the instructor should complete a check for accuracy of the information on the student's factual worksheets.

4)Practice a mock presentation with the class and lead a mock class scoring session so that the students are familiar with the scoring process before they are asked to score other students.

5) Each group will contain two teams for the presentations; the presenters and the observers. While one team is making their presentation, the observers should check off the rubric and score them. After the presentation, each scorer should sign their sheets and tally the total score. Everyone's scoring sheets should be collected, secured together and turned into the instructor or placed in the provided folder. The instructor should act as facilitator, clarifier during this process but not critique the presentations. The teams will switch and the roles of observer and assessors will also switch.

6) The instructor should average the scoring sheets for each team presentation and use this as their assessment grade for the activity.

Note* Using the team assessment approach cuts down on the time needed to evaluate student work, increases student involvement and interest and teaches high order skills such as evaluating/oration.

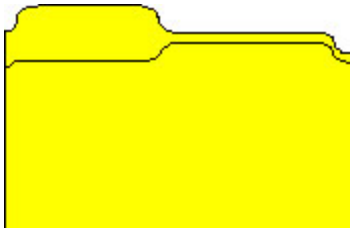
Student Scoring Sheet For The Extended Activity: Climate Change in My City

Team Name making the presentation:

_____

Name of individual scoring the presentation:

_____



Each student is responsible for making an assessment of the presenting group. After the presentation, each scorer should sign their sheets and tally the score. Everyone's scoring sheets should be collected, secured together and turned into the instructor or placed in the provided folder.

10-point assessment

3pts 1) **Pre presentation work**:

_____*Student's data worksheets are all completed and accurate

_____*A bibliography of resources is provided (three different sources needed one of which should be the use of the computer).

***(The instructor should preview the student's data sheets prior to the presentation to check for accuracy**.)

2pts 2) **Group presentation:**

_____*Fits within the 2-5 time minute period

_____*Information was clear and concise

_____*The material was understandable to peer group

2pts 3) **Data Presentation:**

_____*A clear presentation of the data is made using a chart, graph, poster, or visual aide

3pts 4) **Team building**:

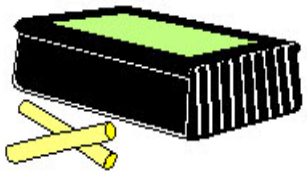
_____*Student task list shows all members participated

_____*A clear use of all team members' skills and talents was demonstrated in the task assignment list

_____* Everyone on the team participated and was involved in the presentation

_____ **Total points**

Climate Change In My City
Activity # 3



Teacher Information: This activity uses NASA's Goddard Institute for Space Science "Common Sense Climate Index". It will be necessary to understand how this climate index works and how to make use of the website. The following steps will help you be prepared to make the lesson a success.

_____1) Read the pages provided that explains how the Climate Index works. "CSCI: Discussion of Climate Index" and CSCI: Climate Indicators in the Climate Index.

_____2) Note: On the maps and graphs the color blue consistently means cooler and yellow or red means warmer. The dark black line on the graphs represents the five-year mean climate index.

_____3) Explore the website www.giss.nasa.gov/data/update/csci/. Type in the website. Click on "World and U.S. Maps. Scroll to the bottom of the page for the U. S. map and click on the city of interest. Once the list of cities in this area appears click again on the city of your interest. This should bring up a map with the climate index and seasonal temperature curves for this city station. Try a variety of worldwide locations.

_____ 4) There are six colored overheads provided for you to use with your class to help them understand the graphs before they work on the website. Familiarize yourself with these overheads.

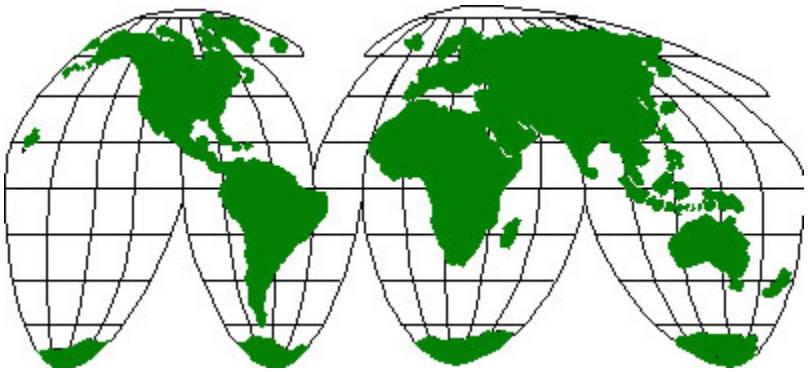
Preparing the students to use the Climate Index website:

The purpose of this mini lesson is to help the students understand what they will see on the website. They will also learn how to read and make observations regarding the graphs and maps.

1**) Use the overhead of Syracuse, NY:**

Identify what the axes are labeled
Explain the red, blue and black lines on the graph to the students. Summarize the meaning of the climate index.

Ask the students to:
A) Describe the climate index trends for Syracuse
B) Explain what is the most recent climate trend?
C) Determine when one of the warmest ten-year periods occurred?
D) (Other questions)



3) Place the overhead of **New York Central Park** on the projector. Break the class up into teams and have them answer the following questions and be ready to share their responses with the class.

A) What ten-year period seemed to be the coolest?
B) What ten-year period seems to be the warmest?
C) What is the most recent trend?
D) Do you find the five-year average (black line) or the bars easier to read, why?

Lead a class discussion regarding the student's responses

4) Change the overhead **to Watertown, NY**:

A) Make at least three observations regarding the graph.
B) Compare this overhead with the one from Syracuse NY. (Provide black and white photocopies of the Syracuse graph). Make at least two observations about how these graphs are the same or different. (You could choose to have students draw a Venn diagram for this question)

Class discussion to review the questions

5) Place the overhead of **Atlantic City** on the projector.

A) Ask the students to compare and contrast this graph with that of Syracuse using the Venn diagram method. Note* the time reference for Atlantic City is from 1950-2000 vs. Syracuse NY which is 1910-2000, make sure that the students notice this point.

B) Make at least three comparisons.

6) Place the overhead **"Climate index 1961-1970 and the four world maps** on the projector for the class to view. Have each student respond to the following questions.

A) What major color shifts occur on the world map from 1961-1990?
B) What do the color shifts indicate in terms of temperatures?
C) Are there any areas of the world that appear to be cooling? If so, where?
D) What appears to be the global trend for the climate Index?

The students should now be ready to complete the lab activity using the website.

Climate Change in My City
Activity #3
Student Worksheet

Name
_____

Date _____

Partner's Name
_____

You will be determining the climate trends for your own city or nearest reference city for the years provided. You will be asked to make observations regarding the graphs similar to the exercise conducted by your instructor. Please read the directions and then complete the tasks assigned. Have fun exploring the world.

Directions:

_____ 1) type in the website www.giss.nasa.gov/data/update/csci on the address bar and type in enter. You are now at NASA's Goddard Institute for Space Science's web site that contains the Common Sense Index for U.S and world cities.

_____ *2)* Scroll to the bottom of the page for the U.S. map. Click on the city on the map closest to you. A list of cities will appear in list form. Click on the name of the city you would like to investigate (choose your own or the nearest city).

_____ 3) Two graphs should appear. One that shows the annual and 5 year mean climate index and the other graph that shows temperature for different seasons throughout the year. These should look like the graphs presented on the overheads by your instructor in the classroom.

_____ 4) Answer the following questions before exploring this site.

A) During what years was a warming trend apparent? _____

B) During what years was a cooling trend apparent?_____

C) What is a major trend for the graphs? _____

D) Other observations about the graphs?_____

_____

E) Compare this graph with that of the U.S. (www.giss.nasa.gov/data/update/csci/bargraphs/)
How are they the same? How are they different?

F) Choose another City anywhere in the world. What location did you choose?

_____

Answer the following questions for this location:

2A) During what years was a warming trend apparent?_____

2B) During what years was a cooling trend apparent?_____

2C) What is a major trend for the graphs?

2D) Other observations about the graphs?

Compare this location with your own city. What is the same and what is different? (Use your own paper to summarize the similarities and differences)