**Title: When Am I Ever Going to Use This?**
**(The pressing question that all Algebra students must have answered.)**
**Part 1**

**Brief Overview:**

This unit is an introductory lesson in obtaining info on the Internet to utilize basic algebra skills. It is designed to get students interested in math by relating real-world data to algebra by using the current technology and hopefully answer their question of, "When will I ever use algebra?" Working in groups of two, the students will collect data from the Internet and answer questions on worksheets. Students will use algebraic concepts of adding and subtracting positive and negative integers, ratios, percents, formulas, graphing, and rounding. Students will also write across the curriculum, integrate geography and social studies, and practice higher learning and thinking skills.

**Link to Standards:**

- **Problem Solving** Students will analyze real-world data to answer real world problem situations in full sentences. Students will also practicing their writing skills.
- **Communication** Students will practice their writing skills while comparing data (writing across the curriculum).
- **Reasoning** Students will collect information from the Internet and develop charts and graphs. Students will answer questions based on collected information and its graphs.
- **Number Relationships** Students will use algebraic concepts of positive and negative integers, ratios, percentages, and basic coordinate graphing using real-world data.
- **Statistics** Students will transform the information collected to a graph to interpret and make predictions.

**Grade/Level:**

Grades 9-12; Basic Algebra and/or Algebra I Class

**Duration/Length:**

This activity will take 2 or 3 days. The activities may take longer than anticipated depending on class duration, student's prior knowledge of computer skills, login skills, and the number of computers available for Internet access.

**Prerequisite Knowledge:**

Students should have working knowledge of the following skills:

- Familiarity of the scroll bar
- Know how to use a mouse
- Opening and closing of files
- Logging into the Internet
- Familiarity with basic Internet terminology
- Collecting data
- Graphing of coordinate points
- Determining percentages

**Objectives:**

Students will:

- work cooperatively in groups.
- collect and organize data from Internet web sites (USA TODAY and the University of Utah) and place it in charts.
- represent and use numbers in determining differences, percentages, analyzing, and graphing data on graph paper.
- analyze graphs in determining appropriate answers to questions.
- write appropriate answers to reasoning questions in full sentence form.
- demonstrate familiarity with geography of the U.S. and reasons for various temperature patterns.

**Materials/Resources/Printed Materials:**

- Computer with access to Internet
- Colored pencils
- Paper
- Calculator
- Atlas and/or map
- Student Activity Sheets 1-4
- Teacher Resources 1-5
- Graphing Calculator with projector panel (optional)

**Development/Procedures:**

- Prior to beginning, teachers should verify the availability of the appropriate World Wide Web sites since the Internet is a dynamic medium.

- Give students an introduction to weather discussing possible high and low temperatures of their areas and make hypothesis of other regions.

- Tell students that today they are going to be analysts and they are going to find the average high temperature of 3 U.S. cities and compare them to their location.

- The procedure to choose the 3 U.S. cities is in Teacher #1.

- Students locate the average max temperature of these cities using info on the Internet, collect, then graph the data: Activity Sheets 1,2,3.

- Students will calculate the temperature differences between the reference city and the new city and answer questions by analyzing the graph: Activity Sheets 2-3.

**Evaluation:**

Teachers will observe students successfully logging in, accessing Internet sites, and correctly collecting, graphing and analyzing data. Teachers will grade worksheets from the individual groups.

**Extension/Follow Up:**

1. Part II of "When Am I Ever Going To Use This?" (another learning unit in this collection) is an extension of this unit. It may be used at any time after this lesson at the teacher's discretion. It enhances the student's knowledge of the Internet, graphing, and interpreting data to answer questions concerning Earth Science and Geography.

2. Other similar units may be developed using information from Web Sites such as:
   Tidal Range Info:
   http://www.catalina.org/goodies/tides.htm
   http://www.sat.net/~drdan/display.htm
   Stock Market:
   http://www.stockcenter.com/cgi-bin/symquot.cgi
   Currency (Money) Converter:
   http://www.usatoday.com/money/stocks/msfl.htm#ecu
   http://www.dynamind-llc.com/demos/currency.cgi
   Track and Field Data:
   http://www.usaldr.org/rmoac-96.htm
   Heart Rate/Sports Conditioning
   http://www.ozemail.com.au/~tcdc/tp.html

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**Sources Used:**

USATODAY
www.usatoday.com/weather/windex.htm

University of Utah
http://www.met.utah.edu/html/maxtemp.html

# NETSCAPE

(Your on-ramp to the information highway!)

To get from High School to the info highway, do the following:

Login to the network and go to the Netscape page
On the Netscape page, ➜***Click*** on **Net Search** (on the Menu Bar!)
You will then see:

NETSEARCH

| Yahoo | Infoseek | Lycos | Magellan | Excite |
|---|---|---|---|---|

Do

Search

(***Click*** on **Yahoo**, if it is not "white")
➜Type **USAToday** in the **Search Box**
➜***Click*** on **Search**

When you come to the Yahoo home page,
you have gotten on the **BELTWAY**.....continue until you get to the correct exit!!
➜***Scroll*** until you see:

**Matching Yahoo Categories**

Business and Economy Companies:Media:Newspapers:USA Today

➜ ***Click*** on **Business and Economy Companies:Media:Newspapers:USA Today**
You will then arrive at another Yahoo screen. If you ***scroll down*** just a little you will see:

- USA Today
- USA Today Life
- USA Today Money
- USA Today Sports
- USA Today Weather

➜***Click*** on the first Bullet.....**USA Today.** (You can go to Money or Sports LATER!)

Congratulations! You should now be at the front page of **USA TODAY**.

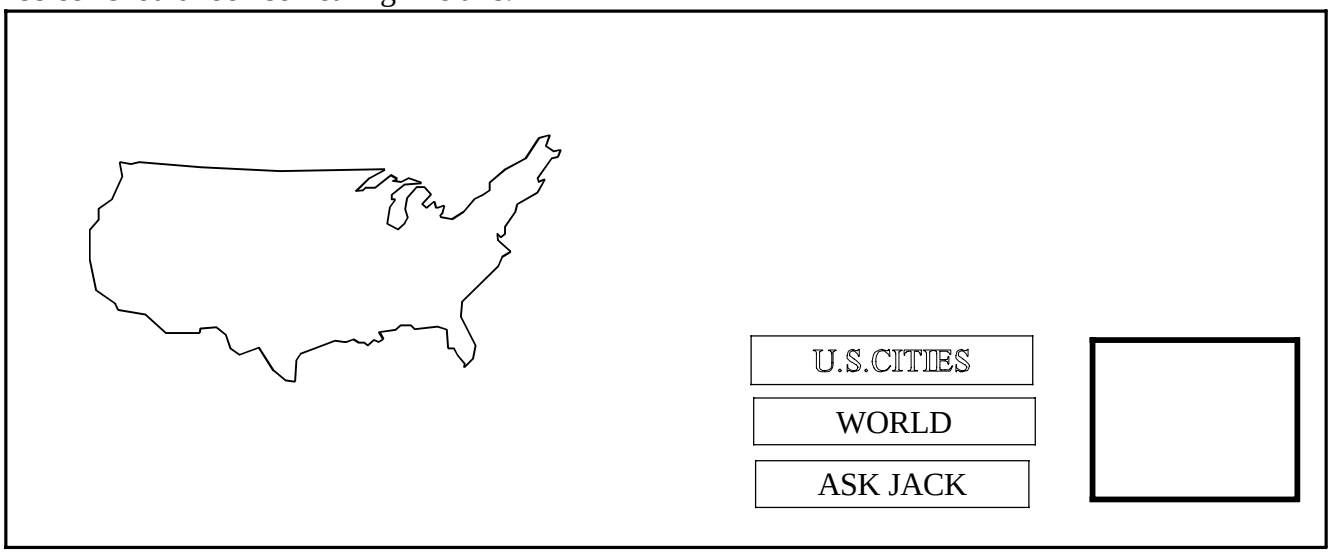
➜***Scroll down*** .....What is the lead story today?

***Keep scrolling***! Notice all the **Top of the news** sections

Don't Detour....➜***scroll*** to **Weather** and➜ ***Click***

➜***Scroll*** to bottom of page and ➜***Click*** on **Go to Weather front page**

Your screen should look something like this:




I know, I know, it is not EXACTLY the same (where is Alaska?)....but, close!

➜***Click*** on the **U.S.CITIES** box.

Now do ***some*** MAJOR ➜***Scrolling***,

all the way to the bottom and ➜***click*** on **Weather index**

On the Weather Index page ➜***Scroll down*** the **Weather topics**

(Notice...alphabetical listing...STAY IN THE A's)

➜***Click*** on **Averages for 275 USA cities**

YOU ARE ALMOST THERE....Long trip, huh?....Where's McDonalds? I'm hungry!

➜***Scroll*** through all the black writing....you will come to a list of blue underlined choices:

| |
|---|
| Normal high temperatures |
| Normal low temperatures |
| Normal Monthly precipitation |

➜***Click*** on Normal high temperatures

# YOU HAVE ARRIVED!!!!!!

Get out of the car....walk around, get a drink, go to the bathroom.....then, start on your worksheets.

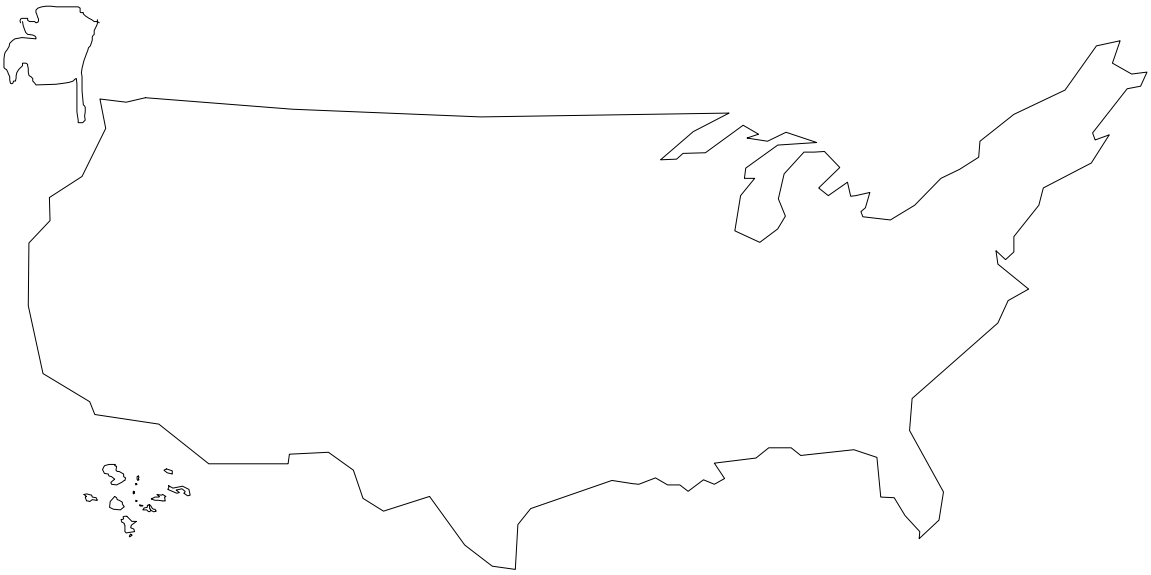
Activity 2

Name_____ Date_____

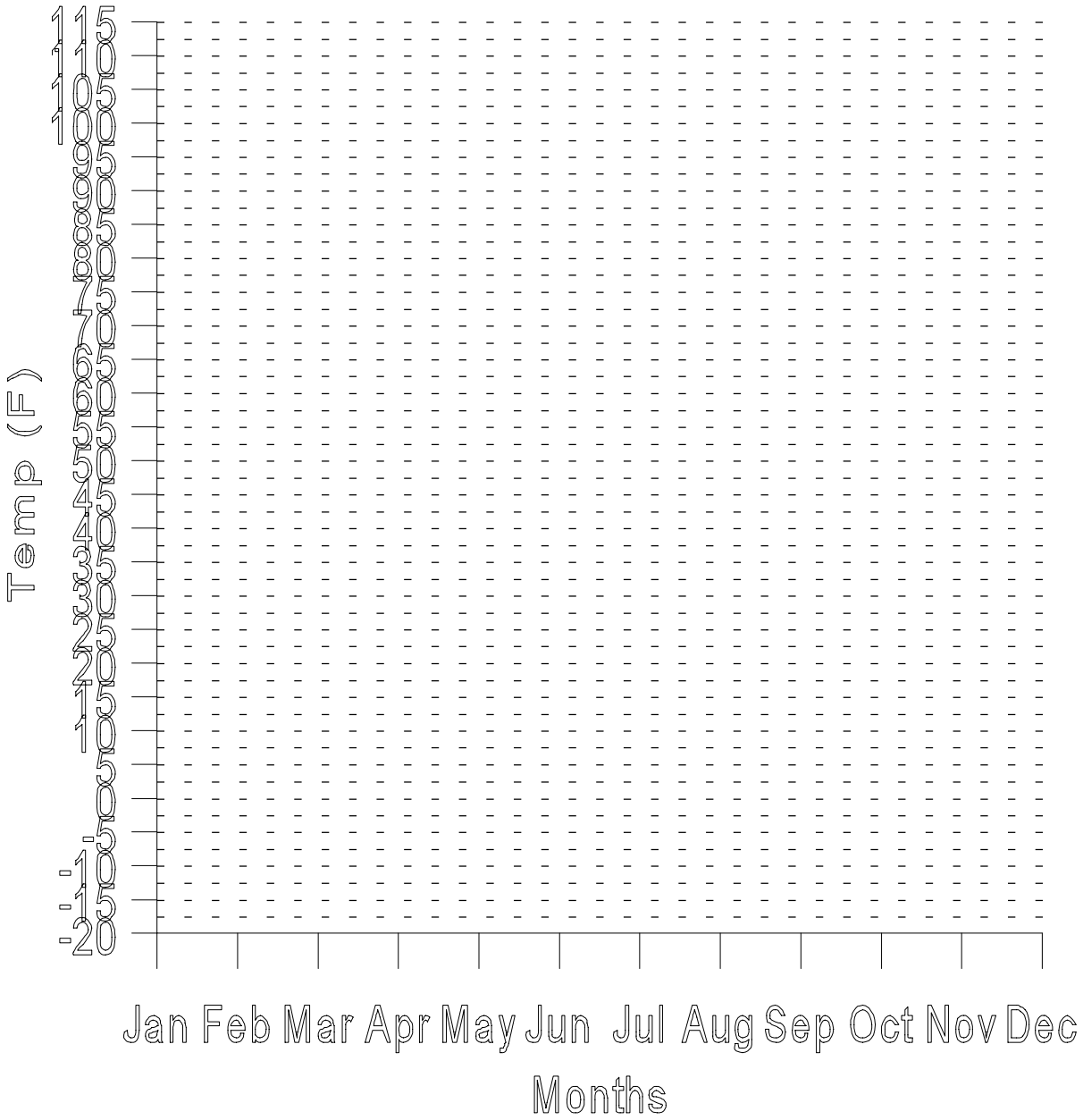
# Monthly Average High Temperature Data for USA Cities

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.Wash., Dulles, D.C. | 41 | 44 | 54 | 66 | 75 | 83 | 87 | 86 | 79 | 68 | 56 | 45 |
| 2. | | | | | | | | | | | | |
| 3. | | | | | | | | | | | | |
| 4. | | | | | | | | | | | | |

Locate and mark the approximate location of each of your cities.



# Average Monthly High Temperatures




Monthly Temperature Differences between _____ and Reference City.

Use the formula: New City Temp - Reference City Temp = Difference

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | |

**City Name** _____

**Answer the following questions on this paper**:

**1.** What month had the highest average temperature?

**2.** What is the Average Yearly high temperature for this city?

A. How many months are ABOVE this temperature?

B. Write a ratio of the number of months above average to the total months in a year.

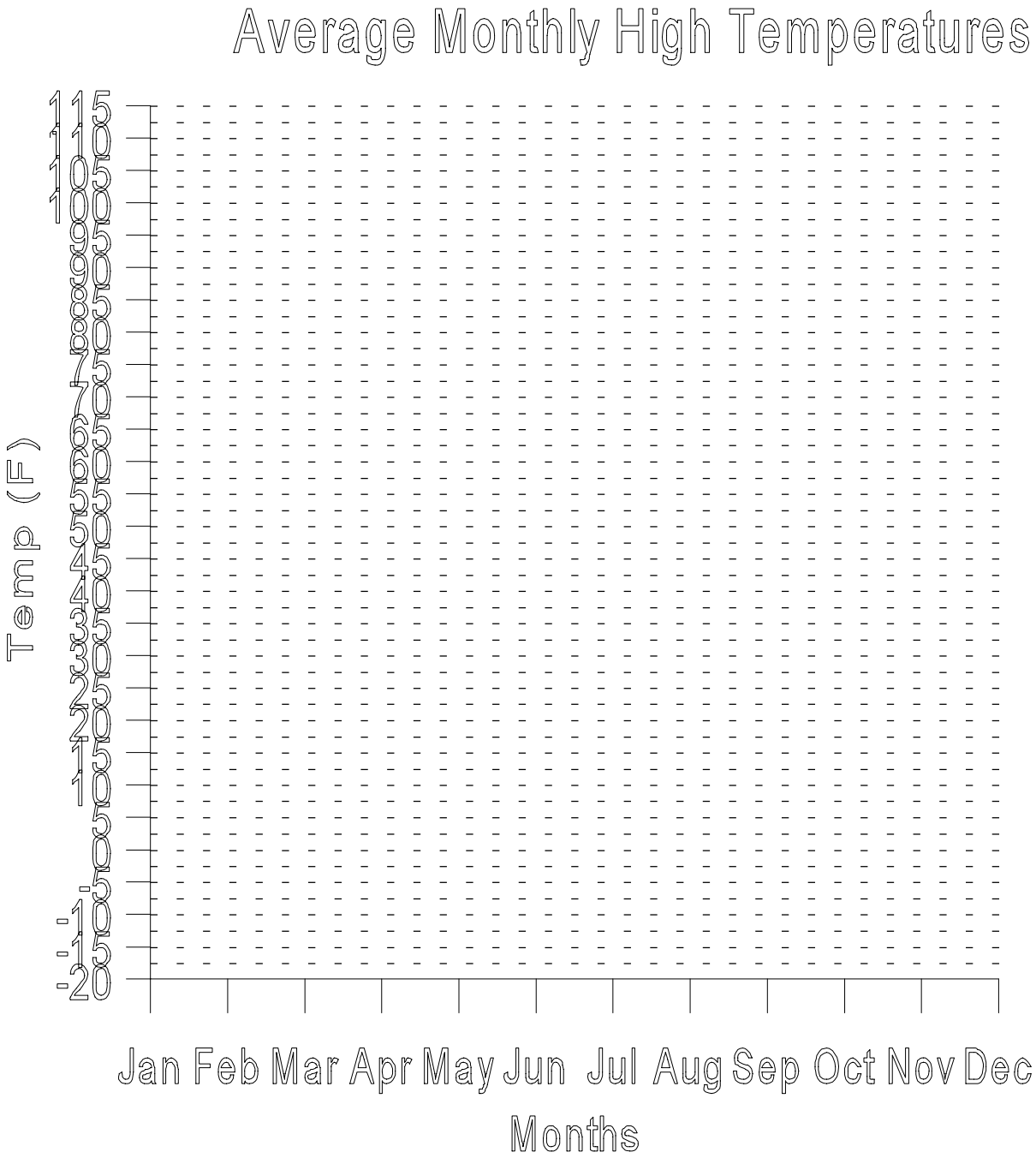
C. What % of the year is above the yearly average temperature?

**3.** How many months of the year is this city COOLER than your reference city?

What % of the year is cooler?

**4**. Using your map (Activity #2) and graph (Activity #3), write a paragraph that explains why the graphs of the new city and reference city differ.

**5.** If you moved to this new city, discuss how would your life be different?
Clothes? Outdoor Activities? Heating and Cooling of home? Etc?




Monthly Temperature Differences between _____ and Reference City.

Use the formula: New City Temp - Reference City Temp = Difference

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | |

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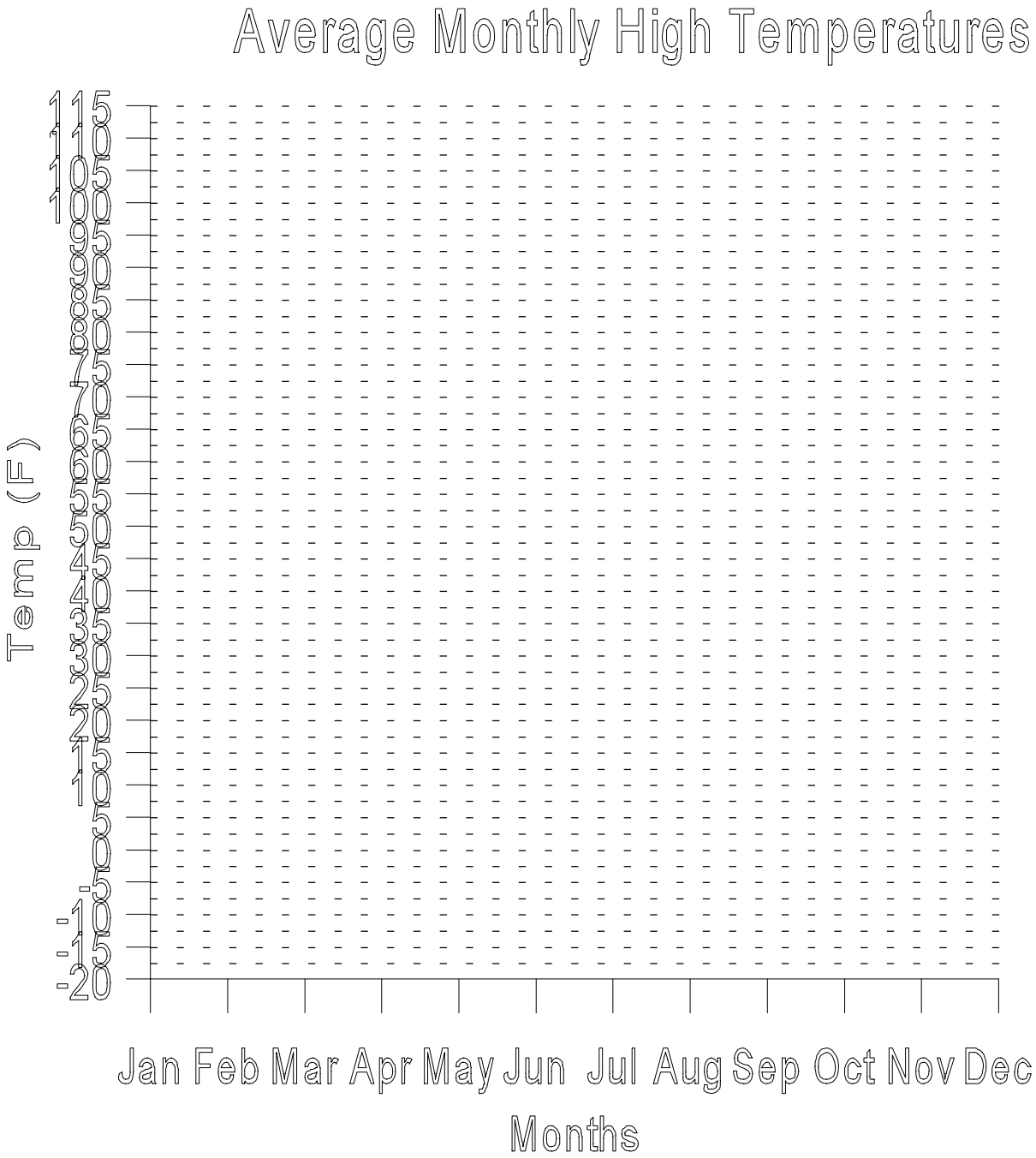
Clothes? Outdoor Activities? Heating and Cooling of home? Etc?




Monthly Temperature Differences between _____ and Reference City.

Use the formula: New City Temp - Reference City Temp = Difference

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | |

**City Name _____**

**Answer the following questions on this paper**:

**1.** What month had the highest average temperature?

**2.** What is the Average Yearly high temperature for this city?

A. How many months are ABOVE this temperature?

B. Write a ratio of the number of months above average to the total months in a year.

C. What % of the year is above the yearly average temperature?

**3.** How many months of the year is this city COOLER than your reference city?

What % of the year is cooler?

**4**. Using your map (Activity #2) and graph (Activity #3), write a paragraph that explains why the graphs of the new city and reference city differ.

**5.** If you moved to this new city, discuss how would your life be different?
Clothes? Outdoor Activities? Heating and Cooling of home? Etc?

# Teacher Instructions

Each location will have to customize this lesson. Our cities were chosen relative to Washington DC. To customize, follow the steps below.

1. Find a location close to where your students live and record the average high temperatures.

2. Choose (by scrolling through the list of cities)
    a. 10-15 cities that are hotter/colder than your location
        -graphs might not intersect or only in one point
    b. 10-15 cities that have little fluctuation in temperature
        -we call these our "moderate" temps
    c. 10-15 cities that have temperatures that are similar to your own
        -we tried to insure that the graphs would cross twice
        Summers warmer, winters cooler than reference city
        -these are our "variance" cities

3. Record cities chosen in #2 on separate small sheets of paper. <u>Keep categories separate</u>...place each category in a separate container.

4. Group students in pairs
    a. Give out packets
    b. Have each pair pick ONE city from each container
    c. Include the following VERBAL instructions as needed
        "Record all data on the worksheets (Show all calculations!)."
        "Round all temperatures to the nearest degree."
        "When plotting and graphing use a different color for EACH new city."
            "If city #1 is green on your map, use green on the graph."
        "Temperature differences on Activity 3 should be listed as + or -.
            For example: if the new city is 5 degrees warmer than your reference city in July, record +5; if 5 degrees cooler, it should be -5. If you use the formula given, your numbers should be correct."

5. The Internet address for the final screen of 275 cities is:
    **http://www.met.utah.edu/html/maxtemp.html**

# Average Monthly High Temperatures
# "Hot" and "Cold" Cities

The cities listed in the table below have temperatures that are below or above that of the reference city of Washington D. C. (Dulles Airport). The first five cities have lower average monthly temperatures and the last five cities have higher average monthly temperatures. The last column give the average annual temperature.

| City | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Avg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Caribou, CT | 20 | 23 | 34 | 46 | 61 | 71 | 76 | 73 | 64 | 52 | 38 | 24 | 48 |
| Mt. Washington, NH | 13 | 13 | 19 | 29 | 41 | 51 | 54 | 53 | 46 | 36 | 27 | 17 | 33 |
| Stampede Pass, WA | 28 | 32 | 35 | 41 | 50 | 57 | 65 | 64 | 59 | 48 | 35 | 30 | 45 |
| Barrow, AK | -8 | -14 | -10 | 5 | 24 | 37 | 45 | 42 | 34 | 19 | 5 | -7 | 14 |
| Alpena, MI | 26 | 28 | 37 | 51 | 64 | 74 | 79 | 77 | 68 | 58 | 43 | 31 | 53 |
| Yuma, AZ | 69 | 74 | 79 | 86 | 94 | 103 | 107 | 106 | 101 | 91 | 77 | 69 | 88 |
| Las Vegas, NV | 56 | 62 | 68 | 77 | 87 | 99 | 105 | 102 | 95 | 82 | 66 | 57 | 80 |
| Roswell, NM | 55 | 60 | 68 | 77 | 85 | 93 | 94 | 91 | 85 | 76 | 63 | 57 | 75 |
| Jacksonville, FL | 65 | 67 | 73 | 80 | 85 | 89 | 91 | 90 | 87 | 80 | 72 | 66 | 79 |
| Savannah, GA | 60 | 63 | 70 | 78 | 84 | 89 | 91 | 90 | 86 | 78 | 70 | 63 | 77 |

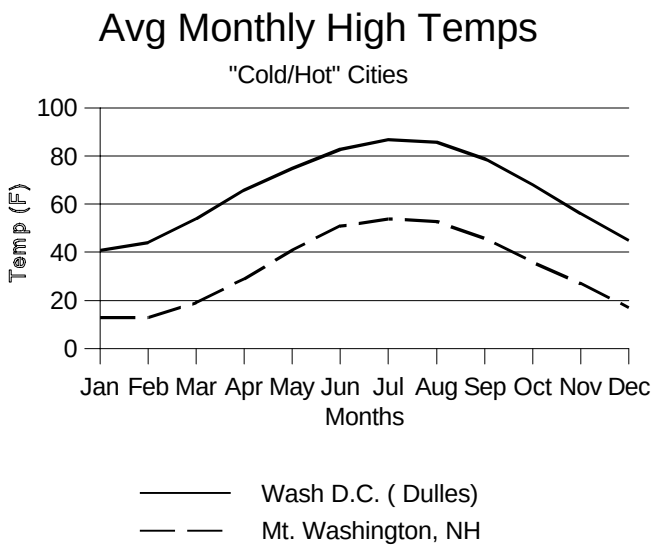
# Average Monthly High Temperatures
# "Moderate" Cities

| City | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Avg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Oak Ridge, TN | 46 | 51 | 59 | 71 | 78 | 85 | 87 | 87 | 81 | 70 | 58 | 49 | 68 |
| Flagstaff AZ. | 42 | 45 | 49 | 57 | 68 | 78 | 82 | 79 | 74 | 64 | 51 | 44 | 61 |
| Eureka, CA | 53 | 55 | 54 | 55 | 57 | 59 | 60 | 61 | 62 | 60 | 58 | 55 | 57 |
| Mount Shasta, CA | 42 | 47 | 51 | 58 | 67 | 75 | 85 | 83 | 78 | 65 | 51 | 44 | 62 |
| Capehat-eras, NC | 53 | 54 | 59 | 67 | 74 | 81 | 84 | 84 | 81 | 72 | 64 | 56 | 69 |
| Astoria, OR | 47 | 51 | 52 | 56 | 60 | 64 | 68 | 69 | 68 | 61 | 54 | 49 | 58 |
| San Diego, CA | 65 | 66 | 66 | 68 | 69 | 71 | 76 | 78 | 77 | 75 | 70 | 66 | 71 |
| San Fran AP, CA | 56 | 59 | 61 | 63 | 66 | 70 | 71 | 72 | 73 | 70 | 63 | 56 | 65 |
| Hilo, HI | 80 | 79 | 79 | 80 | 81 | 83 | 83 | 83 | 84 | 83 | 81 | 80 | 81 |
| Lihue, HI | 78 | 78 | 78 | 79 | 81 | 83 | 84 | 85 | 85 | 83 | 81 | 79 | 81 |

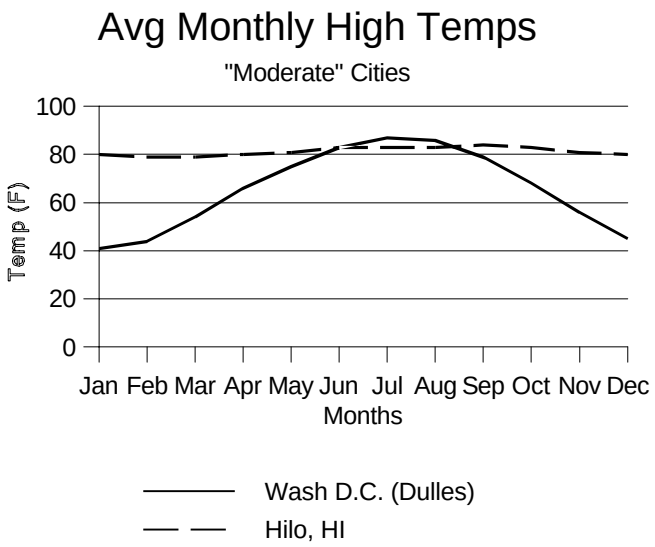
# Average Monthly High Temperatures
# "Variance" Cities

| City | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Avg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Grand Junct, Co | 36 | 45 | 54 | 65 | 76 | 88 | 94 | 90 | 82 | 69 | 51 | 39 | 66 |
| Boise, ID | 37 | 44 | 52 | 61 | 71 | 80 | 91 | 87 | 78 | 65 | 49 | 39 | 63 |
| Winnemucc NV | 42 | 49 | 54 | 62 | 72 | 82 | 93 | 90 | 81 | 69 | 53 | 44 | 66 |
| Elko, NV | 37 | 43 | 49 | 58 | 69 | 79 | 90 | 88 | 79 | 66 | 49 | 38 | 62 |
| Goodland, KS | 41 | 46 | 51 | 63 | 73 | 84 | 91 | 88 | 79 | 68 | 52 | 43 | 65 |
| Denver, CO | 43 | 47 | 51 | 61 | 71 | 82 | 88 | 86 | 78 | 67 | 52 | 46 | 64 |
| Eureka, CA | 35 | 42 | 51 | 65 | 75 | 85 | 91 | 89 | 80 | 69 | 52 | 41 | 57 |
| Ashville, NC | 48 | 51 | 58 | 69 | 76 | 81 | 84 | 84 | 78 | 69 | 59 | 50 | 67 |
| Eugene, OR | 46 | 51 | 55 | 61 | 67 | 74 | 83 | 81 | 76 | 65 | 53 | 47 | 63 |
| Omaha, NE | 30 | 37 | 48 | 64 | 75 | 84 | 89 | 86 | 78 | 67 | 50 | 37 | 60 |

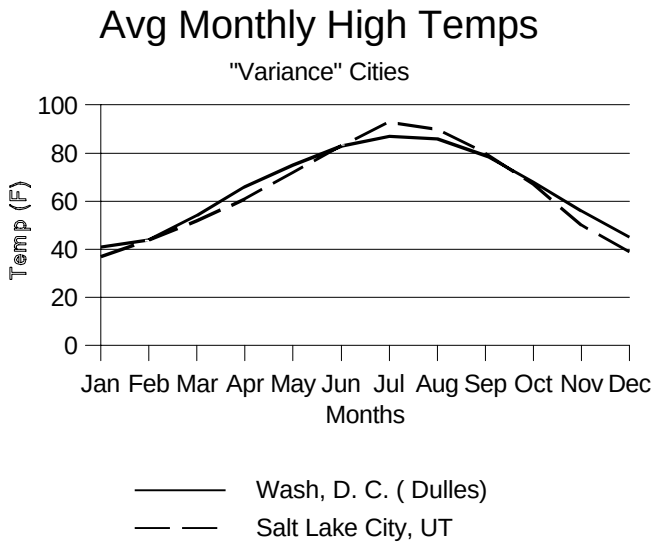
# Sample Graphs




This is a representative chart of a city with a colder monthly high temperature charted against the reference city of Washington, DC.




This is a representative chart of a city with a moderate range in its monthly high temperature charted against the reference city of Washington, DC.




This is a representative chart of a city with a large variance in its monthly high temperature charted against the reference city of Washington, DC.