

<b>TEMPERATURE BAR GRAPH</b>				<b>Student/Class Goal</b> The weather and temperature ranges are often part of adult learners' conversations and they want a better understanding of graphs to help them make future decisions in their everyday lives.	
<b>Outcome</b> <i>(lesson objective)</i> Students will figure mean, median and mode using weather, temperature data, create a bar graph charting one city's high and low temperatures, and formulate three questions based on that graph.				<b>Time Frame</b> 45-90 minutes	
<b>Standard</b> <i>Use Math to Solve Problems and Communicate</i>				<b>NRS EFL 2-6</b>	
<b>Number Sense</b>	<b>Benchmarks</b>	<b>Geometry &amp; Measurement</b>	<b>Benchmarks</b>	<b>Processes</b>	<b>Benchmarks</b>
Words to numbers connection		Geometric figures		Word problems	
Calculation	3.2, 4.2, 5.1, 6.1	Coordinate system		Problem solving strategies	
Order of operations		Perimeter/area/volume formulas		Solutions analysis	4.27, 5.27, 6.28
Compare/order numbers		Graphing two-dimensional figures		Calculator	3.22, 4.28, 5.28, 6.29
Estimation		Measurement relationships		Mathematical terminology/symbols	2.20, 3.23
Exponents/radical expressions		Pythagorean theorem		Logical progression	
<b>Algebra &amp; Patterns</b>	<b>Benchmarks</b>	Measurement applications		Contextual situations	4.31, 5.31, 6.32
Patterns/sequences		Measurement conversions		Mathematical material	
Equations/expressions		Rounding		Logical terms	
Linear/nonlinear representations		<b>Data Analysis &amp; Probability</b>	<b>Benchmarks</b>	Accuracy/precision	
Graphing		Data interpretation	3.16, 4.20, 5.20,	Real-life applications	2.22, 3.27, 4.34, 5.35, 6.36
Linear equations		Data displays construction	2.16, 3.17, 4.21	Independence/range/fluency	3.28, 4.35, 5.36, 6.37
Quadratic equations		Central tendency	3.18, 4.22, 5.22, 6.23		
		Probabilities			
		Contextual probability			
<b>Materials</b> Collection of newspaper weather pages Calculators, graph paper, colored pencils, highlighters <i>Commercial Consumption Graph</i> <i>Temperature Bar Graph Rubric</i> Temperature Bar Graph Learning Objects					
<b>Learner Prior Knowledge</b> Student will be familiar with terms and calculation of mean, mode, median from earlier classroom activities. Calculation may be reviewed in class.					
<b>Instructional Activities</b> Step 1 - Discuss with students when they see or use graphs in their everyday life (bills, newspapers). Inform students how the GED test includes many questions presented in graphic form. Have a newspaper weather page available to demonstrate. Ask the students if they would rather read all the weather information included on that page in written paragraph form or to view it as graphs and charts. Ask them to think about how easy the written form would be to read and understand.					
<b>TEACHER NOTE</b> Talk about bar graphs and why they are effective. Bar graphs make it easy to compare totals that can be counted. They are used to show how something changes over time or to compare items. Bar graphs have an x-axis (horizontal) and a y-axis (vertical).					

The x-axis usually has numbers for the time period or what is being measured and the y-axis has numbers for the amount of times being measure.

Step 2 - Instructor will demonstrate on overhead, chalkboard, or large piece of paper the key elements of a bar graph. Pass out the bar graph example titled *Commercial Consumption* from the National Restaurant Association. Talk about the different parts of this graph including:

Title, x-axis/y-axis and what each represents, scale, data, source of the graph including the year

Additional vocabulary will include perpendicular and parallel. Ask the class what conclusions they can reach regarding income and eating out.

Step 3 – Students choose a United States or world city from the newspaper and note the high and low temperatures for each day in one week. They will calculate the mean, median, and mode for both the high and low temperatures and calculators to verify their answers.

Step 4 - Using the data, graph paper, and colored pencils, they will create graphs representing that data (upper level students might create a double bar graph). Make students aware of the criteria that will be used to assess their work. Distribute the *Temperature Bar Graph* rubric and explain each component.

**WRITING EXTENSION** Each student will create three questions based on his or her bar graph for other students to answer. The questions may be content related, mathematical or a combination.

Step 5 - Students trade graphs and questions. Have the students interpret the data and draw implications that allow them to correctly answer the questions. A class discussion will be the final step. Students will reflect on their success and complete the rubric evaluating his or her work.

**Assessment/Evidence** *(based on outcome)*

Instructor will monitor activity, noting accuracy, independence and fluency.

Graphs and questions will be collected and included in the student portfolio along with the rubric.

**Teacher Reflection/Lesson Evaluation**

*Students enjoyed the activity and took more time than I anticipated drawing the graphs. Some wanted to take the graphs home to spend more time on making them look better. The questions were varied. Higher-levels students wrote more complex question.*

**Next Steps**

More practice with pre-GED or GED textbook or old practice tests problems in this area. Temperature Bar Graph Learning Objects will give students additional practice interpreting bar graphs and temperature scales.

**Technology Integration**

**Purposeful/Transparent**

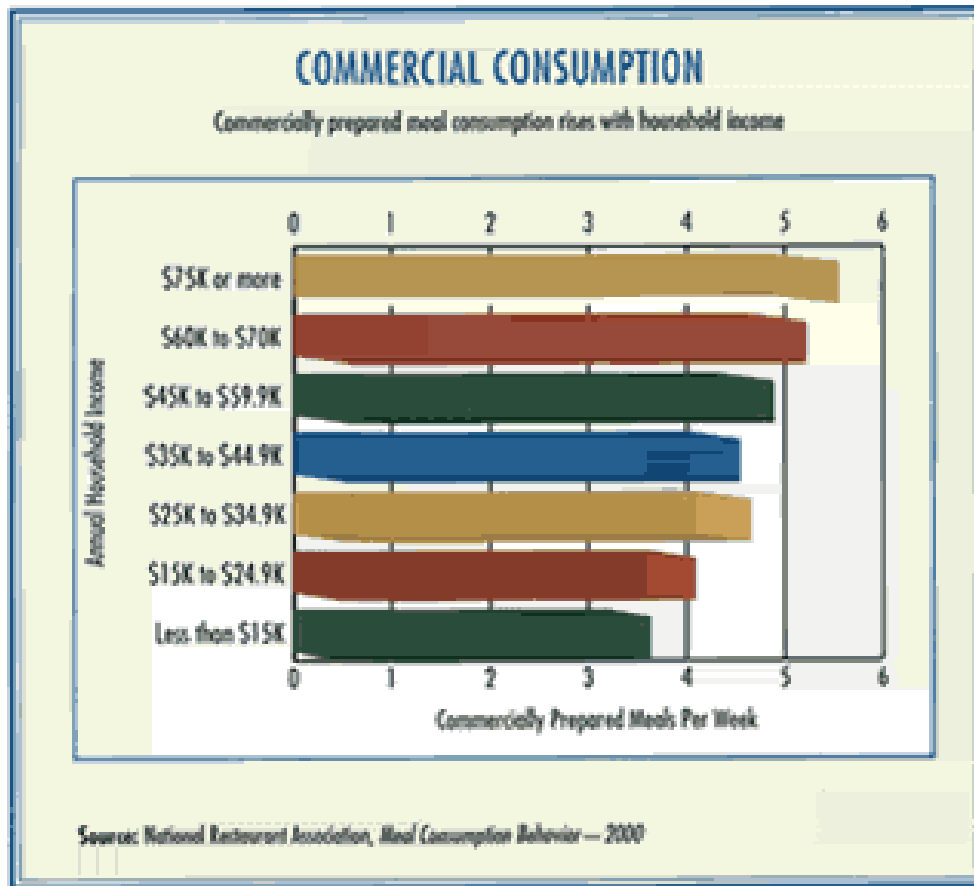
The GED test includes more graphs and charts then ever before. This activity will help the student prepare for material and questions in this format. The teacher models the creation of the key elements of a graph.

**Contextual**

Everyday material comes to our students in the form of graphs and tables. This activity will build confidence in understanding this information.

**Building Expertise**

Students are more likely to remember and understand something they have created themselves. This activity will increase their ability to find average, median, and mode in other situations. Graphs may be a new concept for students or this activity may act as a review for the group. Evaluating student's prior knowledge will be an important part for teachers to do before presenting this information.



**Source: National Restaurant Association, Meal Consumption Behavior, 2000**

**This graph shows that income is an important indicator of families eating commercially prepared meals.**

What is the title of this graph?

What number does the x-axis represent? The y-axis?

Who is more likely to dine out – Consumers with a household income of \$75,000 or more or consumers with a household income of \$35-\$44,000?

What generalization can you make regarding eating out and household income? Why?

## Temperature Bar Graph Rubric

Student Name \_\_\_\_\_ Date \_\_\_\_\_

CATEGORY	4	3	2	1
Labeling of X axis	The X axis has a clear, neat label that describes the units used for the independent variable (e.g. days, months).	The X axis has a clear label that describes the units used for the independent variable.	The X axis has a label.	The X axis is not labeled.
Labeling of Y axis	The Y axis has a clear, neat label that describes the units and the dependent variable (e.g. % of dogfood eaten).	The Y axis has a clear label that describes the units and the dependent variable (e.g. % of dogfood eaten).	The Y axis has a label.	The Y axis is not labeled.
Data Table	Data in the table are well organized, accurate, and easy to read.	Data in the table are organized, accurate, and easy to read.	Data in the table are accurate and easy to read.	Data in the table are not accurate and/or cannot be read.
Units	All units are described (in a key or with labels) and are appropriately sized for the data set.	Most units are described (in a key or with labels) and are appropriately sized for the data set.	All units are described (in a key or with labels) but are not appropriately sized for the data set.	Units are neither described NOR appropriately sized for the data set.
Neatness and Attractiveness	Exceptionally well designed, neat, and attractive. Colors that go well together are used to make the graph more readable. A ruler and graph paper (or graphing computer program) are used.	Neat and relatively attractive. A ruler and graph paper (or graphing computer program) are used to make the graph more readable.	Lines are neatly drawn but the graph appears quite plain.	Appears messy and "thrown together" in a hurry. Lines are visibly crooked.



<http://www.wisconline.org>

### **Fahrenheit/Celsius Temperature Scales**

**Author:** Terry Bartelt

**School:** Fox Valley Technical College **Date:** 4/14/2008

**Description:** Learners study the process of mathematically converting temperatures between the Fahrenheit and Celsius scales. A short quiz completes the learning object.

[http://www.wisc-online.com/objects/index\\_tj.asp?objID=ELE3108](http://www.wisc-online.com/objects/index_tj.asp?objID=ELE3108)

### **Reading and Interpreting Bar Graphs**

**Author:** Francine Nettesheim

**School:** Northcentral Technical College **Date:** 7/10/2002

**Description:** Students identify the various parts of a bar graph, read and interpret data presented in a bar graph, and calculate the data to solve various application problems.

[http://www.wisc-online.com/objects/index\\_tj.asp?objID=ABM3802](http://www.wisc-online.com/objects/index_tj.asp?objID=ABM3802)

### **Melting Point and Freezing Point**

**Author:** Dr. Martin McClinton, Debbie McClinton, Dr. Miriam Douglass

**School:** Brevard Community College, Fox Valley Technical College **Date:** 2/4/2005

**Description:** Learners observe that the melting of a solid and the freezing of its liquid occur at the same temperature. The melting point is an intrinsic property and is used to identify a substance.

[http://www.wisc-online.com/objects/index\\_tj.asp?objID=GCH4504](http://www.wisc-online.com/objects/index_tj.asp?objID=GCH4504)

**Temperature Bar Graph Learning Objects**