

<b>CREATING LINE GRAPHS</b>		<b>Student/Class Goal</b> A student was concerned that she couldn't help her son with his math homework - constructing a graph. Since she and the other students know there will be these kinds of questions on the GED test, they requested some help with graphs and charts.
<b>Outcome</b> <i>(lesson objective)</i> Students will relate data to coordinate graphs and plot points on this graph.		<b>Time Frame</b> 2- 40 minute classes
<b>Standard</b> <i>Use Math to Solve Problems and Communicate</i>		<b>NRS EFL 3-4</b>
<b>COPS</b> Understand, interpret, and work with pictures, numbers, and symbolic information.	<b>Activity Addresses Components of Performance</b> Utilize minimum wage data to construct a graph.	
Apply knowledge of mathematical concepts and procedures to figure out how to answer a question, solve a problem, make a prediction, or carry out a task that has a mathematical dimension	Relate wages and years to the x and y coordinates of a graph.	
Define and select data to be used in solving the problem.	Choose years from a chart to plot on the x-axis.	
Determine the degree of precision required by the situation.	Decide the appropriate time intervals to graph, e.g., every 5 years or every 10 years.	
Solve problem using appropriate quantitative procedures and verify that the results are reasonable.	Graph the data.	
Communicate results using a variety of mathematical representations, including graphs, chart, tables, and algebraic models.	Share graphs with the instructor and other students.	
<b>Materials</b> Graphs and charts from newspapers, ads, or any print or Internet source Graph paper <i>Average Daily Temperature</i> Graph <i>Table of Minimum Wages</i> Handout Table or chart of Gasoline Prices Creating Line Graphs Learning Objects		
<b>Learner Prior Knowledge</b> Students can identify key features (x-axis, y-axis) of simple everyday graphs and charts.		
<b>Instructional Activities</b> Step 1 - Ask students to suggest ways that numerical information can be presented. Use newspapers, ads, or other literature to provide examples of circle graphs, bar charts, line graphs and other pictorial information.  Step 2 - Present a situation with numbers and no explanation, e.g., 1, 2, 4, 16, 32. Help students see that no graph or chart can be made because there is no information relating the numbers. In order to create a graph or chart there must be two types of information: the numbers and information about what the numbers represent  Step 3 – Utilize an overhead transparency blank graph or a chalkboard chart of the coordinate system (blank graph paper). Collect some data from the class, e.g., the number of students who live in various zip codes. Create an example of a coordinate graph using the zip codes for the x-axis and the numbers of students for the y-axis.  <b>TEACHER NOTE</b> Line graphs are used to show how something changes over time. Line graphs have an x-axis and a y-axis. The x-axis usually has numbers for the time period and the y-axis has numbers for what is being measured. Line graphs can be used when you're plotting data that has peaks (ups) and valleys (downs) or that was collected in a short period of time.  Step 4 - Pass out the <i>Average Daily Temperature</i> line graph or make into an overhead. Talk about the parts of this graph including: Title, x-axis, y-axis		

Look at the label and what is being measured, look at the increments. What conclusions can we draw about the average daily temperature from 2/14 to 2/24? Is the temperature generally on the way up or on the way down?

Step 5 - Distribute the handout with the *Table of Minimum Wages* data listed. For levels 3 and 4 use graph sheets with predetermined years listed on the x-axis. Levels 5 and 6 students should decide how many years or what time intervals to choose for the x-axis (e.g., every 5 years or every 10 years). All four levels choose appropriate money divisions for the y-axis. Each line should be worth \$.25 or \$.50. Demonstrate plotting a year versus the wage. Students complete the graph.

**WRITING STANDARD EXTENSION** Predict the next minimum wage. Calculate the earnings for a 40- hour work week. What type of lifestyle could be maintained with minimum wage earnings?

Step 6 - Distribute charts of current state averages of gasoline prices or a list of monthly average gas prices for Ohio. See [AAA Daily Fuel Gauge Report](#) for a list. Students decide the axis for the data and plot the points. When their graphs are complete, the students share with each other and explain their decisions for the intervals.

**WRITING STANDARD EXTENSION** Students write paragraphs or essays predicting the changes in gasoline prices. The essays could include reasons for the increases or decreases in prices.

Step 7 - For practice, students should choose another topic of interest and produce a graph to represent the data found in their research.

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

Labeled graphs with appropriate intervals for the data

**Teacher Reflection/Lesson Evaluation**

*Not yet completed.*

**Next Steps**

Transfer the graphing skill with real data to graphing ordered pairs. Creating Line Graphs Learning Objects will give students additional practice with interpreting line graphs.

**Technology Integration**

Wage and Hour Division <http://www.dol.gov/whd/minwage/america.htm>

AAA Daily Fuel Gauge Report <http://fuelgaugereport.opisnet.com/index.asp>

**Purposeful/Transparent**

The activities are selected in order to create a better understanding of graphs. The students can monitor their progress as they plot the points from the data chart.

**Contextual**

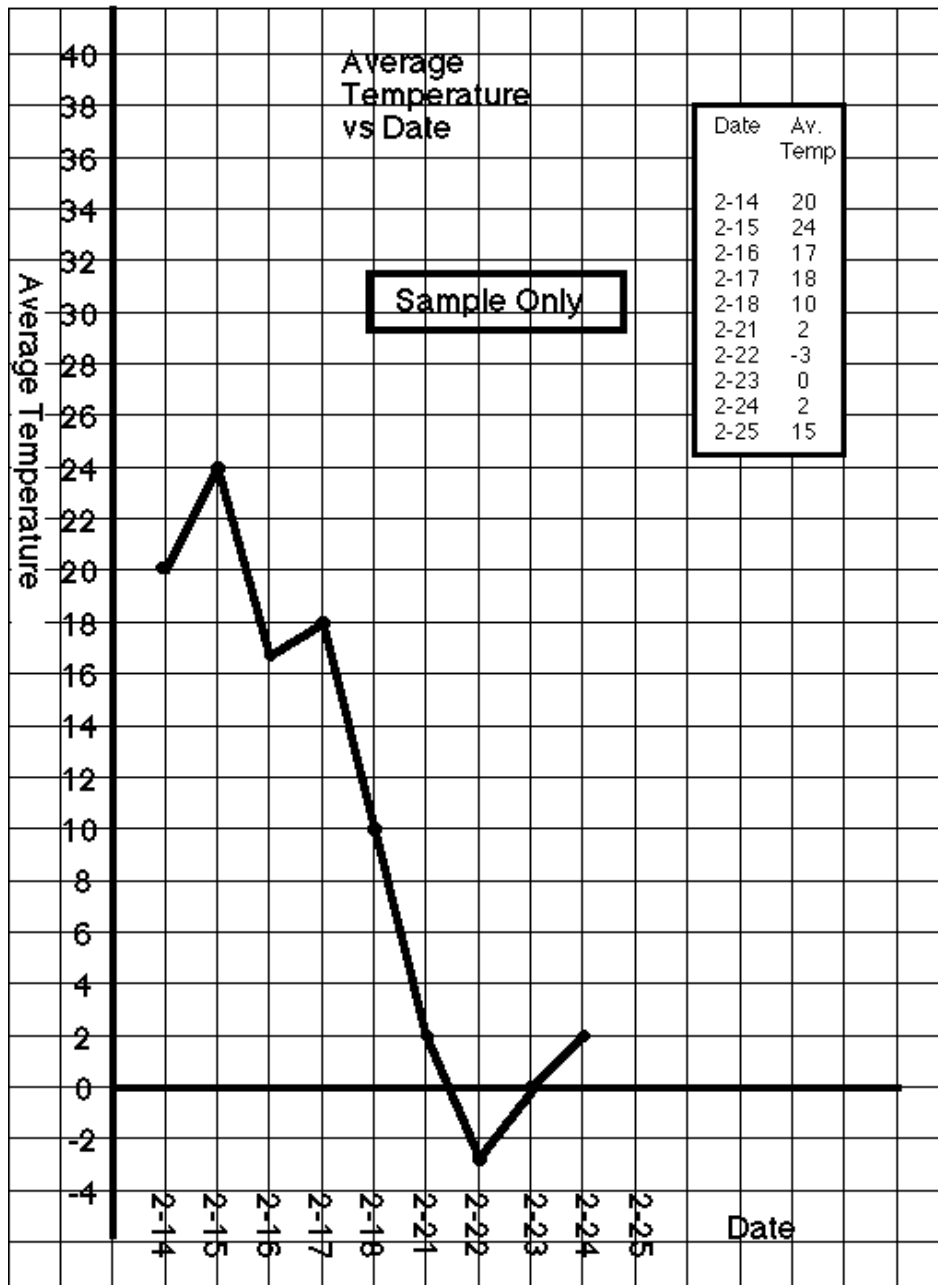
Many of the students earn minimum wage or less and would be interested to see the changes over time. The second graph relates to the high gasoline prices.

**Building Expertise**

Students have some knowledge of graphs and charts (newspapers, ads, promotional solicitations, etc.) This activity allows them to create one type of graph and could be done in a series of lessons on different kinds of graphs.

**US MINIMUM WAGE RATES 1938-PRESENT**

<b>YEAR</b>	<b>WAGE</b>	<b>YEAR</b>	<b>WAGE</b>
	<b>\$</b>		<b>\$</b>
1938	.25	1972	1.60
1939	.30	1973	1.60
1940	.30	1974	2.00
1941	.30	1975	2.10
1942	.30	1976	2.30
1943	.30	1977	2.30
1944	.30	1978	2.65
1945	.40	1979	2.90
1946	.40	1980	3.10
1947	.40	1981	3.35
1948	.40	1982	3.35
1949	.40	1983	3.35
1950	.75	1984	3.35
1951	.75	1985	3.35
1952	.75	1986	3.35
1953	.75	1987	3.35
1954	.75	1988	3.35
1955	.75	1989	3.35
1956	1.00	1990	3.80
1957	1.00	1991	4.25
1958	1.00	1992	4.25
1959	1.00	1993	4.25
1960	1.00	1994	4.25
1961	1.15	1995	4.25
1962	1.15	1996	4.75
1963	1.25	1997	5.15
1964	1.25	1998	5.15
1965	1.25	1999	5.15
1966	1.25	2000	5.15
1967	1.40	2001	5.15
1968	1.60	2002	5.15
1969	1.60	2003	5.15
1970	1.60	2004	5.15
1971	1.60	2005	5.15



This line graph shows the daily temperature for a period of nine days. The x-axis represents the dates and the y-axis represents the temperature in degrees.

What day was the coldest? The warmest?

What is the average temperature during this ten day period?

Are temperatures in general increasing or decreasing?

What geographic location could these temperatures represent or not represent?

**Average Daily Temperature Line Graph**



<http://www.wisconline.org>

### **Line Graphs**

**Author:** Barbara Laedtke

**School:** Fox Valley Technical College **Date:** 9/16/2002

**Description:** Learners read an explanation of line graphs and demonstrate their knowledge of the parts of a graph in an interactive exercise.

[http://www.wisc-online.com/objects/index\\_tj.asp?objID=SOC302](http://www.wisc-online.com/objects/index_tj.asp?objID=SOC302)

### **Interpreting Line Graphs**

**Author:** Barbara Laedtke

**School:** Fox Valley Technical College **Date:** 4/19/2002

**Description:** Students analyze line graphs and answer questions about the information shown.

[http://www.wisc-online.com/objects/index\\_tj.asp?objID=SOC702](http://www.wisc-online.com/objects/index_tj.asp?objID=SOC702)