



Curriculum Units by Fellows of the Yale-New Haven Teachers Institute
2008 Volume VI: Depicting and Analyzing Data: Enriching Science and Math Curricula through Graphical Displays and Mapping

Using Graphical Displays to Depict Health Trends of America's Youth

Curriculum Unit 08.06.01

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Introduction

The famous quote, "A picture is worth a thousand words," best describes the themes of this unit. The pictures that this unit will focus specifically on graphical displays of student collected data. As an important text feature, a graph can often provide a substantial amount of information more clearly and concisely than written word. Graphs can be seen daily in the real world, such as in newspapers, in school textbooks, and on television. Graphical representations are essential to understanding research, trends, and survey results. In this unit students will both read graphs for understanding and create numerous types of graphs.

The graphs students will create will be based on health issues and trends of students their age. Through my experience I have learned that students at the middle school level like to learn about themselves and compare themselves to other kids their age. As a result, in this unit, students will use health logs to track their own health data, such as hours of sleep, time spent using media, types of food being consumed, and levels of exercise. Students will also be provided with the opportunity to select their survey topics. They will make personal connections, as well as make connections to their peers. Guiding instruction based on student interests makes the ideas more meaningful and appealing to students.

Betsy Ross Arts Magnet School, located in New Haven Connecticut, is a diverse fifth grade through eight grade middle school. Approximately 500 students attend; fifty percent are from New Haven while the remaining fifty percent come from 25 surrounding towns. The diversity of the school is relevant to the make up of the two fifth grade classes that will be participating in this unit. While intended for fifth grade, this unit can accommodate any grade level that studies data and statistics as part of their curriculum. Each of the classes participating follows the same science curriculum based on the New Haven Public Schools Fifth Grade Science curriculum. This curriculum was derived from the State of Connecticut's Core Science Curriculum Framework. One of the participating classes does however utilize the school system's sixth grade mathematics curriculum. The students in this class, known as Math Course 1, scored at or above the fifth grade level at the time of entering the school. Their academic level is based on scores they received on their fourth grade Connecticut Mastery Test and the STAR Math program administered during the first few days of school. The other class, Math 2, scored at or below the fifth grade level on the same measures. As a result, the expectations, content, and assessment tools may vary depending on the class. Both class's grade level expectations are derived

from the Connecticut PreK - 8 Mathematics Curriculum Standards distributed by the Connecticut State Department of Education.

Objectives

The mathematics objectives for this unit are for students to interpret a variety of standard and complex graphs, create data collection materials, collect and organize data, determine the most appropriate way to display data, create graphs by hand, and use computer software to create graphs.

While the primary focus of the unit is mathematics, students will also meet core science objectives. Students will conduct investigations, read for information, and use data to draw conclusions.

Content Standards

This unit provides both mathematic and scientific connections. Rather than isolate the content areas, this unit will combine these subjects to create a more comprehensive understanding of the material. Students will also have the opportunity to learn and use popular computer software to create data tables and graphs.

While the two content areas will be taught in unison, the standards it meets are divided into their own subjects. The mathematics standards, which are the emphasis throughout the unit, focus on analyzing, interpreting, and presenting data. The standards are listed below:

- Analyze patterns and data to make generalizations, make predictions, and to identify trends.
- Represent sets of data using line plots, bar graphs, double bar graphs, pictographs, simple circle graphs, stem-and-leaf plots, and scatter plots.
- Compare different representations of the same data set and evaluate how well each kind of display represents the feature of the data.
- Design and conduct surveys of a representative sample of a population and use the data collected to begin to make inferences about the general population.
- Determine the mean, median, and mode of a data set and explain in writing, how they are affected by a change in data set.

Other Connecticut Mastery Test standards will be reviewed and addressed such as, Venn diagrams, classifying information, and drawing conclusions based on graphs and tables.

The core scientific inquiry, literacy, and numeracy standards are achieved based on the core grade 3 - 5 themes and many of their corresponding expected performances. The curriculum currently states that “Scientific inquiry is a thoughtful and coordinated attempt to search out, describe, explain and predict natural phenomena. Scientific literacy includes speaking, listening, presenting, interpreting, reading and writing about science. Mathematics provides useful tools for the description, analysis and presentation of scientific data and ideas.”¹ More specific strands include for students to:

- Make observations and ask questions about objects, organisms and the environment.
- Seek relevant information in books, magazines, and electronic media.
- Design and conduct simple investigations.
- Use data to construct reasonable explanations.
- Analyze, critique, and communicate investigations using words, graphs and drawings.
- Search the web and locate relevant science information.

Unit Goal

The unit goal is for students to understand the benefits of using graphical models to display statistical data. Students will use this knowledge to depict current health issues facing their peers. Ultimately, students will demonstrate their knowledge of both topics by turning in their mathematics dictionary, creating a graphing portfolio, displaying their findings, and presenting their information to the class.

Unit Overview

The unit is distributed into parts scaffolding mathematical statistical skills and social scientific concerns. Each piece of this unit corresponds directly with the unit goal of displaying and presenting knowledge of graphs, statistics, and current health trends in today’s youth.

While the unit is presented in different components, the mathematics vocabulary dictionary, personal health tracking journal, and graphing portfolio will run throughout the duration of the unit. Each student will receive a notebook to be used for their health journals. The graphing portfolio will be a collection of all graphs created throughout the unit.

The students’ mathematics dictionary is a year long compilation of all the mathematics terms they have

learned throughout the year. At the top of each page students have one letter of the alphabet, i.e. at the top of the first page students write the letter “A”, at the top of the second page students write the letter “B” and so on. Throughout the unit students will come across new vocabulary that will be entered into their journal. Some of the required vocabulary will be researched and completed for homework. Students will write the word, the definition, use it in a clarifying sentence, and draw a picture of it. A clarifying sentence is a definition in the students’ own words or a sentence using the key words to shorten a lengthy definition. The students will complete and turn in their dictionary for a grade and it will be returned to them for future reference. See example below:

Word:	Definition
Clarifying Sentence	Picture

The personal health tracking journal will be compiled a notebook. This journal will be used for students to record their personal health data which will be decided upon at the completion of the first lesson. Students will probably track their food consumption, exercise, time watching television, time on the computer and playing video games, and amount of time spent sleeping. These numbers will be used to create a variety of graphs.

Often throughout the unit there are class and small group discussion pertaining to the created graphs. This is to encourage student discourse and help prepare the students for similar questions in their final graphing portfolio.

Students will also create a graphing portfolio which will be used to assess the final drafts of all their graphs. Based on the graphing portfolio checklist (Appendix A), this portfolio will contain a frequency table, bar graph, double bar graph, pictograph, pie chart, line plot, and stem-and-leaf plot.

Unit

Health Issues Introduction

The unit will begin by asking students to open their health journal to the first page. At the top of the page students will write the word, “Graph.” The students will complete a 90 second “free” write and emphasizing words and associations based on the word graph. We will discuss their brainstorming activity and I will propose the question, “Why do we use graphs?” This is a reoccurring theme throughout the unit and the

students will have other opportunities to add to this page and refine their ideas.

Halfway down the page the students will write the word, "Health". With their group, students will be instructed to list health issues they think are facing students today. Their ideas will be added to chart paper and we will discuss why they chose those topics.

Issues Facing Today's Youth

Each student will receive a health tracking journal. I will instruct them on its purpose and how we are going to use it to record personal health information. The introduction of the graphing portion will include a discussion on how we are going to address a variety of health topics while dueling using graphing. The students will receive two handouts listing the graphing portfolio checklist (Appendix A) and a graphing rubric (Appendix B). As a class we will discuss the information that we want to track. I anticipate topics such as the kinds of food eaten, the amount of sleep students get, time spend doing physical activity, and time spend using electronic media will probably be discussed.

Frequency Tables

The students will begin by viewing my health information in a disorganized manner. All the information will be present but scattered throughout the page. I will begin by asking the students about what the information shows. I will propose the question, "Is there a better way for me to organize my information so it is easier to read?" The students are familiar with tables of values through previous lessons, so the students will be introduced to frequency tables. They are going to be using frequency tables to record their data so it is important for them to understand that a frequency table is a list of categories of data and the number of times they occur. On the overhead or chalkboard we will create data collection approaches.

On one page of the health tracking journal we will create a two-column table of values to track the amount of sleep the students get each night. On another page the students will also create two two-column tables of values, but for the number of minutes using media and one for the time spent doing physical activity. Frequency tables will be used to organize data the remainder of their data, such as kinds of food being eaten. While students have been previously exposed to using the tally system, most will not have used frequency tables to depict collected data. I will show an example of a completed table and the class will discuss the properties and characteristics of the frequency table and what information we can extract from the collected data. On the third page of the journal, student will outline a frequency table. The blank frequency tables will be used to track the types of food consumed and any other selected information on the subsequent pages. We will next discuss how to complete a frequency table. Finally, students will enter table of values and frequency table as the first entries into their mathematics dictionary.

Vocabulary

Table of values and frequency table

Types of Graphs

Each student will be given a graphic organizer listing the names of the 7 graphs they will be learning. There will be two adjoining blank boxes next to the name of the graph. Cards with a picture of the graph and the graphs description will be distributed. Based on their prior knowledge or key words in the definition, students will attempt to match the graph name with the picture and description. Upon completion, we will begin

reviewing the attempted and correct responses. Cards that are correctly matched will be glued to the graphic organizers. This can be used to refer back to throughout the unit. For the remainder of class, students will enter frequency table and bar graph in their mathematics graphing dictionary. Each student will write the term, the definition, a clarifying sentence, and draw a picture.

To review the material the following day, students will each receive one card with either the graph name, a picture of the graph, or the graph description on it. Students will get up from their seats and have to find the people in the class who have the corresponding cards. I will time the amount of time it takes for the students to determine their partners. Every few days the students will receive a different card and be timed on how long it takes them to complete the activity. This information will be recorded in a table that is displayed in the front of the room. This activity will take place every few days and later be used to develop a line graph.

Bar Graphs

While various types of graphs are included in the state standards there is an emphasis on bar graphs because they are often used in the Connecticut Mastery Test. As a result, it is important that students can understand, read, and create bar graphs. A strong emphasis will be placed on the mastery of this component.

The students will begin by reading a bar graph of the time I spend doing my daily activities. Each bar will represent the amount of time I spend eating, exercising, sleeping, on the computer, and watching television in one week. I will have the students begin by telling me things that they observe about the graph. I anticipate responses, such as the title, how much time I spend sleeping, and that the graph is labeled in hours. Once the students are complete I will highlight any oversights. Next, I will state that all bar graphs have a "3-2-1". This is a graphing teaching technique I use to reinforce that the students complete all the components of a graph. The "3" stands for three titles because each graph has three titles: the main title, the title of the x-axis, and the title of the y-axis. The "2" represents the labels of the x-axis and y-axis. The "1" is the data placed on the graph. Throughout the teaching of bar graphs, and other similar graphs, I constantly repeat, "Do you have your 3-2-1?" and the students know what I am referring to and can check their work.

The next step in understanding bar graphs is developing graphing reading skills. I will ask the students a series of questions from basic to more complex. A basic question would be, "What activity do I spend the most time doing in one week?" Soon I would move to more difficult questions such as, "What is the difference between the time I spend sleeping versus the time I spend watching television?" Finally a complex question would be, "Based on this graph, predict how much time I watch television in a month? Explain how you determined your answer." Once I am sure that the students can read a graph I will begin making bar graphs with students.

We will begin by discussing the vocabulary and inputting it into our mathematics dictionaries. Next a blank frequency table will be placed on the overhead. The topic will be to input the number of hours that five students spend sleeping on a Monday night. As a class we will discuss how to begin creating a bar graph. The first step will be to give it a specific title such as, The Number of Hours Five Students from Room 182 Spend Sleeping on a Monday Night. Next we will discuss the other titles, labels, and how to input the data. Important concepts that the students will review is equally spacing the scale, equally spacing the bars, beginning the graph with a zero at the origin, not drawing the bars so they touch, and put at least one space between the y-axis and the first bar. These items will be on a checklist on the chalk board so upon completion of other bar graphs students can recheck their own graphs.

Based on their own data that the students have been collecting in their health journal students will draw and

complete the frequency table based on the number of time they spend sleeping, eating, watching television, and on the computer in either one day or one week, depending on the level of the students. To also differentiate instruction, students will be provided with a choice of three types of graph paper to choose from. Students will work on their own bar graphs from guidance of a classroom pair. The students will work together to create a bar graph, but using their own data. Using the completed bar graph students will answer a series of questions similar to those asked at the beginning of the unit. Students will also need to make predictions based on their graph. The graphs and questions will be collected and corrected and returned for students to create their final draft for their graphing portfolio.

Vocabulary

Bar graph, origin, x-axis, and y-axis

Double Bar Graph

The students in my class will use a double bar graph to compare the preferred type of physical activity by the students of two classrooms, such as basketball, baseball/softball, dance, hockey, or football. To scaffold the ideas, students will begin by creating a regular bar graph using the data collected from their class. I will instruct the students to leave an extra space for the other classes bar. This graph reinforces information previously learned about bar graphs while setting the stage for double bar graphs. The information from the other participating class will be used to create the double bar.

On the overhead projector I will display a copy of what one group completed already. The copy I selected will have all the necessary elements. I will have each group compare their copy to the copy on the overhead to make sure they have included all the necessary titles and labels. Once the students have checked their work, we will begin adding the second bar. The instruction will begin by using the frequency table from the other class to input the second bar. The first bar will be modeled and the students will talk me through how to complete the remainder of the bars. I will propose the question, "How do we know which bar goes with which class?" We will discuss student responses and I will introduce the next vocabulary word, key. A key is used as an explanation to clarify the graph. Students will create a key, finish the graph, enter the word in their vocabulary dictionary, and then complete a Venn diagram comparing and contrasting a bar graph with a double bar graph.

For homework students will use the same sports survey asking twenty 5th graders and twenty adults and compose the data in a double bar graph. The next day, as a class, we will check for the necessary elements and make any necessary corrections. We will compile all of the students' data into a class frequency table. The students will work with a pair to create a double bar graph with the new data. This graph will be entered into the graphing portfolio and assessed using the graphing rubric.

Vocabulary

Double bar graph and key

Pictograph

The pictograph is the next component of the graph portfolio. Before beginning the graph students will go to the computer lab and research food groups. They will receive an internet guide (Appendix C) to lead them in their search. Students will first determine what the food groups are and what students their age should eat. As

a class we will discuss the data.

The students will create a human pictograph based on food they should eat and then draw a pictograph on the food they do eat. We will begin by looking at the pictograph we looked at on the first day. I will have the students tell me the parts of the graph and list them on the board. Then, we will focus our attention on the grid on the floor. I will ask for volunteers to determine what steps we need to make to create the graph. Using small and large wipe-off boards, students will create titles and a key for our graph on what and how much of each food groups students should eat in a day. They will use their bodies to represent two items. Students will then create a pictograph on paper drawing the foods they actually eat in a day. We will compare and contrast their difference between each other and between what is expected of them. The students are to recommend one dietary change for themselves and make it their goal for the week.

For homework students will create a bar graph and a pictograph using the data from their health journal about the number of minutes that they spend on different forms of media each week. The two graphs will be compared to discuss which information best represents the data.

Vocabulary

Pictograph

Pie chart

When developing a pie chart, students need to use percents to display their data. In this graph students are going to create a pie chart using the same data from their pictograph. Based on the skills the students learned about percents earlier in the year, students will convert the data about the food groups that they consumed during the week to percents. A popular computer software program will be used to create the pie chart. Since students are already familiar with a key and writing specific titles. I expect students to be able to do it independently. I will however show them where the information needs to be placed on the computer program.

The purpose of students using the same information as use in the pictograph is for the students to make comparisons, predictions, and have a discussion on which graph is most appropriate to display the data. Basically, asking the question, "Which graph better represents the food groups you eat in a week?" Students must also be able to justify their answers.

Vocabulary

Pie chart and percent

Midway Review

Approximately halfway through the unit I would use this as an opportunity to review the material. Thus far we have learned what each graph is use for, important vocabulary, how to create a frequency table, how to turn a frequency table into a graph, and how to create 4 types of graphs. Each of these topics would be readdressed during the review. First, I would reintroduce the matching game used at the beginning of the unit and have students match the name of the graph, the definition of the graph, and the picture of the graph.

Second, students would have the opportunity to review their vocabulary words by rereading their material and testing each other. The purpose of this game is for students to prepare for a vocabulary race. Students are split up into three teams. Each teams stands in a straight line facing the chalkboard. I read a definition or the

purpose of a graph and the first student in each line has to run up to the board and write the corresponding vocabulary word. Each student will have at least two opportunities to go up to the board. The first person to correctly write the vocabulary word earns their team a point. The team with the most points wins.

Next, students will have to create a frequency table with a partner and a health topic that they want to investigate. Each team will pick a topic related to health to ask their peers. Each team will be assigned to a classroom in the school and they will have to survey the class. They will return to the room with their information and create the correct type of graph on large graph chart paper. Completing the graph student will present the information they determined. They will also have to make predictions and draw conclusions from the collected data.

Scatter plot

As per the CMT strands students do not have to create a scatter plot, but be able to read one. A scatter plot represents data in order to determine a correlation. As students enter the room they will be instructed to fill out a table written on chart paper in the front of the room. The table will have two columns that need to be completed, the first column is the number of hours students spend watching television in one week and the second column is the number of hours students spend sleeping each week. We will turn the classroom into a grid for the scatter plot. As a class we will determine what the x-axis and y-axis need to be labeled and the specific title of the graph. Students will have to use their bodies as the points. Students will put themselves where they think they belong and I will have the students announce their numbers so the rest of the class can determine if their classmates are standing in the right place. The students have already worked with ordered pairs so this activity is similar to a concept that they have already worked with. I will then read the following statistics, "Before Thomas Edison's invention of the light bulb, people slept an average of 10 hours a night; today Americans average 6.9 hours of sleep on weeknights and 7.5 hours per night on weekends. School-aged children (1st through 5th grades) get 9.5 hours, but experts recommend 10-11 hours".² We will discuss who sleeps more than the national average and who sleeps less. We will draw conclusions on why they think that it is. I will allow the students to raise questions about the topic and discuss solutions how to be sure to get the adequate amount of sleep.

Vocabulary

Scatter plot

Line Graph

Line graphs complement the created unit because the students are often measuring the changes in their behavior over time. Because a line graph is how data changes over time, the students will use it to plot their personal health data. I will begin by showing the class three line graphs. One of the graphs will be correctly done, one will be missing a title, and one will not show change in time. In their groups student will have to determine which graph is correctly done and what is wrong with the other two graphs. We will identify this as a class, then using the accurate graph as model we discuss similarities between a line graph and the other graphs we have learned. We will make a list of the necessary components of a line graph. Using the skills students will have learned from the other graphs, students will create their own line graphs based on data from their health journal. Students can choose which information they want to use. The line graph must include a change over a week and they must include a frequency table. Upon assessment I will be checking if the students correctly interpreted data from their frequency table. I will also reinforce the importance of using a ruler to complete a line graph. While I will be circulating the room while the students are working, when they

are finished we will have a one-on-one meeting. The goal of this meeting is for me to go through the list of line graph requirements with the student and help them determine if their graph has all the necessary elements. If the student is missing an element they will have the opportunity to make adjustments and if the graph is complete they can put it in their graphing portfolio. I will also review their portfolio to be sure that the student understands important concepts and if any changes need to be made or concepts need to be reinforced.

Vocabulary

Line graph

Stem-and-Leaf

The last graphing component is the stem-and-leaf plot. The purpose of a stem-and-leaf plot is used to show the shape and distribution of individual pieces of data. The stem-and-leaf plot will be use to compare the students data of the number of hours that they sleep in one week. Together we will make a class stem-and-leaf plot. For homework the students will need to collect the same data from twenty adults. The students will then have to create a stem-and-leaf plot on their own depicting the data. The next day in class we will discuss, similarities and differences, why they believe there are similarities and differences, and predict what the plots would look like if we asked 100 people.

Vocabulary

Stem-and-leaf plot, stem, and leaf

Graphs as Pictures

Students are generally used to traditional forms of graphing and have now been exposed to a variety of ways to display data. I would like for students to also be able to show information in more unique and descriptive ways that can show more than just a list of data. As a result, students will create a graphical map from a graph for information about smoking

If as a class we are studying health, why is it important to examine smoking? This question will generate a discussion about how smoking effects health. Students will be split into pairs and receive a modified version of the graph found at http://gis.esri.com/library/userconf/health01/papers/hc01_p01a/hc01_p01a8.jpg. This graph is titled Lung and Bronchus Cancer: 1998, however I will modify it for the use of this activity to show only the current percent of smokers per each of the 50 states. The students will use this data to create a map to display the findings and determine any trends.

More specifically, each student pair will receive the modified graph, a blank United States graph, and a United States graph with the states labeled. A scale and corresponding color will be developed for the map, i.e., blue is 10%-14%, green is 15%-19%, yellow is 20%-24%, orange is 25%-29%, and red is 30% and above. The students will then color in the state depending on what percentage of the state smokes, using the state labeled map as a guide to where each state is located. Upon completion students will discuss trends, the benefits of this type of graph, and observations.

While students are working on their map, I will take another opportunity to meet with the students individually to review their graphing portfolio. We will go through the graphs, I will ask questions, check for corrections,

and make new corrections if necessary.

Research Project

The research project will primarily be done at home, but some of the steps will be some at school. First students must choose a health topic, such as sleep, exercise, calorie intake, etc. Next, students are to research on the internet or in books to collect five important facts or statistics about their topic. Students will work in pairs to develop a survey to use to ask their peers. They need to collect the data, organize it in a table, and create two different graphs using the same information. The rubric (Appendix B) clearly states the required components of the task. Once students have completed the graphs they are to answer the questions on the handout (Appendix D) and prepare to present their findings to the class.

Unit Conclusion

The graphing portfolio, dictionary, journal, and final research project and presentation all contribute to their final grade. The rubric (Appendix B) outlines the required information necessary to complete the project.

Notes

1 Connecticut Department of Education. (2004). *Core science curriculum framework matrix of k-10 concept development: Science inquiry & conceptual themes in physical, life, earth sciences and societal applications*.

2 Sleep Facts and Stats. Retrieved June 30, 2008, from National Sleep Foundation Web site:

http://www.sleepfoundation.org/site/c.huIXKjM0IxF/b.2419253/k.7989/Sleep_Facts_and_Stats.htm

Appendix A

Graph Portfolio Checklist

Using graph collection

1. Bar Graph

- A specific title
- x-axis and is correctly titled
- y-axis and is correctly titled
- x-axis and is correctly labeled
- y-axis are correctly labeled
- The data is correct and spaces between bars

2. Double Bar Graph

- A specific title
- x-axis and is correctly titled
- y-axis and is correctly titled
- x-axis and is correctly labeled
- y-axis are correctly labeled
- The data is correct and spaces between bars
- A key is correctly created

3. Pictograph

- A specific title
- A key
- Item to represent number
- The data is correct

4. Pie Chart

- A specific title
- Numbers are changed to percents
- A key
- The data is correct

5. Frequency Table

- A specific title
- Tallies are correct
- Frequencies are correct
- Each row is labeled

6. Line Graph

- A specific title
- x-axis and is correctly titled
- y-axis and is correctly titled
- x-axis and is correctly labeled
- y-axis are correctly labeled
- A points are correctly placed
- A straight line connects the points

7. Stem-and-leaf Plot

- A specific title
- The stems are correct
- The leaves are correct
- The stems and leaves are ordered from least to greatest
- All the data is used

Appendix B

Graphing Rubric

Graphing Rubric

	4	3	2	1
Bar Graph Time spent on daily activities	5 or more items from the checklist	4 items from the checklist	3 items from the checklist	2 or less items from the checklist
Double Bar Graph Class total sports data	6 or more items from the checklist	5 items from the checklist	4 items from the checklist	3 or less items from the checklist
Pictograph Forms of media	4 items from the checklist	3 items from the checklist	2 items from the checklist	1 item from the checklist
Circle Graph Forms of media	4 items from the checklist	3 items from the checklist	2 items from the checklist	1 item from the checklist
Frequency Table For line graph	4 items from the checklist	3 items from the checklist	2 items from the checklist	1 item from the checklist
Line Graph Choice – Change over time	6 or more items from the checklist	5 items from the checklist	4 items from the checklist	3 or less items from the checklist
Stem-and-Leaf Plot	4 or more items from the checklist	3 items from the checklist	2 items from the checklist	1 item from the checklist

	4	3	2	1
Final Project Frequency Table	4 items from the checklist	3 items from the checklist	2 items from the checklist	1 item from the checklist
Final Project Graph 1	Same as above			
Final Project Graph 2	Same as above			
Final Project Questions	Questions a and b are answered correctly and completely; using evidence from the graphs	Questions a and b are answered mostly correctly and completely; using evidence from the graphs	Questions a and b are answered well, but not using evidence from the graphs	Questions a and b are incomplete and do not use evidence from the graphs
Final Project Questions	Questions c, d, and e are answered correctly and completely; using evidence from the graphs	Questions c, d, and e are answered mostly correctly and completely; using evidence from the graphs	Questions c, d, and e are answered well, but not using evidence from the graphs	Questions c, d, and e are incomplete and do not use evidence from the graphs

Total Points: Part 2 _____

	4	3	2	1
Health Journal	Health information is recorded and tracked everyday and effort is shown	Health information is recorded most days and effort is shown	Health information is incomplete most days	Health information is missing and little effort is shown
Graphing Dictionary	18 or more words have all 4 components: word, definition, clarifying sentence, and picture	14-17 words have all 4 components: word, definition, clarifying sentence, and picture	Most words are written but missing some of the components	Dictionary is incomplete: less than 11 words or most are missing all 4 components

Total Points: Part 3 _____

Total Points Part 1, 2, and 3: _____

Points 56 – 43 – A 42 – 36 – B 35 – 23 – C 22 or below – Redo

Comments:

Appendix C

Internet Guide - Food Groups

Using the following website to complete the table www.mypyramid.gov/pyramid/index

Complete the table below

Food Group Name	3 Examples	How much for someone my age?

Appendix D

Final Project Handout

Step 1: With your partner decide on a health topic you want to investigate. Be specific.

Step 2: Use the internet to research five specific facts related to your health topic.

Step 3: With your partner create a frequency table to collect data from peers on your health topic.

Step 4: Collect data from a random sample of students.

Step 5: Create 2 appropriate graphs to display your data.

Step 6: Compare and contrast the data you collected versus the research.

Step 7: Written responses:

- A. Why is a graph important to depict data?
- B. Which of the two graphs you created best displays the data you collected?
- C. What conclusions can you make about the data you collected?
- D. What predictions can you make about the data you collected? For example, if 100 people were surveyed how would the information change or stay the same?
- E. What advice would you give the students based on the data you collected?

Step 8: Present information to class.

Reading List

Teacher Resources

<http://aappolicy.aappublications.org/cgi/content/full/pediatrics;107/2/423>

Teachers can use this site to extract data on television and kids and the effects of media on students.

http://aacap.org/cs/root/facts_for_families/children_and_watching_tv

The effect of television on kids.

<http://www.census.gov/ipc/www/idb/>

Demographic data and country ranking of US data.

<http://children.webmd.com/news/20040702/video-games-tv-double-childhood-obesity-risk>

Video games effect on obesity.

http://www.doh.wa.gov/cfh/adfactsheets/whatsup_nutrition.htm

Adolescent and nutritional information. Some food statistics from Washington state.

http://www.fitness.gov/home_resources.htm

President's Council on physical fitness and sports.

http://gis.esri.com/library/userconf/health01/papers/hc01_p01a/hc01_p01a8.jpg.

Individual state smoking data.

<http://www.incompetech.com/graphpaper/lite/>

This site allows you to print graph paper to specific size specifications. A great idea for differentiating instruction.

<http://www.sciencenetlinks.com/lessons.cfm?BenchmarkID=12&DocID=34>

A teacher created adolescent sleep lesson plan.

Tufte, Edward. *The Visual Display of Quantitative Information* . 2nd. Cheshire: Graphics Press LLC, 2001.

A text on the history of graphing.

Student and Teacher Resources

Houghton Mifflin Science. *Discovery Works* . Boston: Houghton Mifflin Company, 2000.

A science text book used by New Haven Public Schools that can reinforce the concepts being taught in this unit.

www.kidshealth.org/parent/nutrition

A list of student and teacher friendly and interesting articles on weight, nutrition, and health.

<http://www.mcwdn.org/Graphs/TabGraphMain.html>

Students can quiz themselves on reading different types of graphs.

<http://www.mypyramid.gov/pyramid/index>

Government website for students or adults on the food guide pyramid.

<http://nces.ed.gov/nceskids/createagraph/default.aspx>

A student friendly government site that is great for students to develop computerized graphs.

<http://www.ncsu.edu/labwrite/res/res-homepage.htm>

NSF sponsored graphic resource site describes types of graphs and when to use them. Also provides a flow chart to determine exactly the correct graph.

http://www.nytimes.com/interactive/2008/02/23/movies/20080223_REVENUE_GRAPHIC.html

An interactive and interesting movie graph that students can view a more complex graphs.

<http://nces.ed.gov/nceskids/createagraph/default.aspx>

A student friendly site to graph data.

<http://www.shodor.org/interactivate/activities/>

Students can use their own data or view graphs already made to easily create online graphs.

<http://www.statcan.ca/english/edu/power/ch9/using/using.htm>

This site shows students and teachers different types of graphs and how they are used. The site uses statistics that students would enjoy and understand and shows graphs that are not well done.

<http://www.shodor.org/interactivate/activities/bargraph/>

<http://www.shodor.org/interactivate/activities/BarGraphSorter/>

<http://www.shodor.org/interactivate/activities/BoxPlot/>

<http://www.shodor.org/interactivate/activities/BoxPlotTwo/>

<http://www.shodor.org/interactivate/activities/CircleGraph/>

<http://www.shodor.org/interactivate/activities/Histogram/>

<http://www.shodor.org/interactivate/activities/MultiBarGraph/>

<http://www.shodor.org/interactivate/activities/PieChart/>

<http://www.shodor.org/interactivate/activities/ScatterPlot/>

<http://www.shodor.org/interactivate/activities/StemAndLeafPlotter/>

Graphing programs and activities to create and view graphs.

<http://www.sleepfoundation.org/site/c.huIXKjM0IxF/b.2417141/k.C60C/Welcome.htm>

A website for students and teachers about sleep habits and information on improved sleep.

<https://teachersinstitute.yale.edu>

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