

**GED 2002 Teachers' Handbook of Lesson Plans**

<b>Content Area</b> Social Studies	<b>Lesson Title</b> <i>Being an Educated Consumer of Statistics</i>	<b>Correlation to Framework</b> 02.06	<b>Lesson Number</b> 47
<b>Objectives/Learner Outcomes</b>  At the end of this lesson, the learner will be able to: <ul style="list-style-type: none"> <li>• To identify the key issues affecting the validity of surveys</li> <li>• Have an understanding of data collection methods in general</li> <li>• Understand how to read his/her child's test scores/report cards by recognizing the basic principles and definitions of percentile, quartile, and bell curve.</li> <li>• Understand popular culture surveys, polls, ratings presented in the media.</li> </ul>		<b>Materials/Resources/Internet Sites/Handouts/Worksheets</b> <ul style="list-style-type: none"> <li>• Internet Resources               <ul style="list-style-type: none"> <li>○ US Census Bureau: <a href="http://www.enc.org">www.enc.org</a>.</li> <li>○ For surveys: Television and radio news research surveys addressing topics such as newsroom profitability, health issues, salaries, staff diversity, career, and internships, etc.</li> <li>○ For polls: Topics ranging from pre-election data to horse races gun laws to immigration, including a free website of various polls that can be used in lessons <a href="http://www.gallup.com">www.gallup.com</a>, <a href="http://www.pollingreport.com">www.pollingreport.com</a>, <a href="http://www.pollhost.com">www.pollhost.com</a></li> </ul> </li> <li>• Handout – <b><i>STATS Vocabulary Sheet</i></b></li> <li>• Handout – <b><i>Analyzing the STATS Questionnaires</i></b></li> </ul>	
<b>Pre-Requisite Knowledge</b>  The learner should be able to: <ul style="list-style-type: none"> <li>• Understand and complete basic percentage problems</li> <li>• Understand the basics for the interpretation of graphs, charts, and surveys</li> <li>• Identify information from polls, surveys, questionnaires, children's FCAT reports, magazines, and newspaper reports.</li> </ul>		<b>Key Words</b> (See definition page to be used as a handout) <ul style="list-style-type: none"> <li>• Data</li> <li>• Statistics</li> <li>• Population</li> <li>• Census</li> <li>• Sample</li> <li>• Mean</li> <li>• Median</li> <li>• Mode</li> <li>• Bell curve</li> <li>• Percentile</li> <li>• Quartile</li> <li>• Standard Deviation</li> <li>• Correlation vs. causation</li> <li>• Quantitative data</li> <li>• Qualitative data</li> </ul>	

### **Anticipatory Set/Introduction**

To introduce the lesson,

**Say:** Many of us use statistical analyses that refer to test scores and assessment measures. Today, we are going to look at the information related to you or your children's test scores. However, statistics come into our lives in other ways. The media submerges us with studies, surveys, polls, risks, chances, and top ten lists of everything you could imagine. It is important to be able to understand what they all mean before we take them at their face value.

**Ask:** What statistical information presented by the media has your interest lately?

### **Preview Questions for Lesson**

1. What is a bell curve?
2. How do people use statistical reports in their everyday life?
3. What can you conclude from surveys? How can you use them?
4. Why does it make a difference whether or not you understand the statistics that back up test scores?
5. How do you use statistics in your daily life?

### **Instructional Outline**

**Say:** Statistics are part of our every day life. In fact, most of us see and hear statistical reports in every aspect of the media. Sometimes this influences our decisions on financial matters, career choices, and health issues.

You may wish to continue the discussion on statistics by asking questions such as the following:

- How might you be influenced by a statistical report on having a one in nine chance of developing colon cancer?
- How do you interpret your children's percentile and/or quartile test scores?
- Are you an average American who watches 25 plus hours of television per week?
- Are your children within the average range of normal height and weight?

Have available different types of reports to share with students so that they can see differences between reports used in education, businesses, the media, etc.

**Say:** Identify a particular area of interest that has been reported in the media through the use of a statistical analysis.  
Examples: Neilson Survey, Presidential popularity poll, etc.

**Process/Activities**

**Say:** Let's go over the kind of data used to report statistics. Refer to Handout – **STATS Vocabulary Sheet**. To teach or test students on key issues of data collection, use vocabulary cue cards. Have students choose a card and find the matching definition.

Have students bring in their own or their children's latest FCAT scores. Provide a sample if students do not have their own. Have a class discussion answering the questions on the **STATS Questionnaire** referring to the bell curve. To extend the activity, provide a list of scores and have students rank them from lowest to highest and identify the percentile (dividing point between the lowest 1% of scores and the rest) and identify the quartiles (divides the list into four groups of 25% each). Have them reproduce their own bell curve with three standard deviations by plotting scores given.

Divide the class into small groups of four students each. Provide each group with newspapers, magazines, or time to search on the Internet for a survey or vocabulary (cue) cards. Have students scan the media source for a poll, study, survey or top # list to report to class. Group reports by the "what" and the "why" of their findings.

**Say:** Today, we are going to work together in small groups to see what statistical reports we can find in the newspaper, magazine, and/or Internet. You will analyze the report telling us what statistical principles were reported, how the results were calculated, and what that would mean to us in our everyday life. Ready? Begin.

Walk around the classroom to check on the students' progress. Provide thought provoking questions to group once they have identified a "report."

**Product/Evaluation/Summary**

Have students create their own statistical report based on any of the four sources of media information (Internet, newspaper, TV, magazine). Example: Report on the average number of individuals who use public transportation in their county. Calculate the percentage of savings if using public transportation as opposed to private transportation.

**Teaching to Different Types of Learners**

	<b>Visual</b>	<b>Auditory</b>	<b>Kinesthetic/Tactile</b>
<b>Learning Activity</b>	Provide written directions to students. Use an overhead projector and transparencies to show students examples of the bell curve and point out the information to be identified.	Incorporate activities that allow students to work together and discuss what they have done.	Have students match pictures or models to a statistical report until they have mastered the concept.
<b>Special Differentiation Strategies</b>	Use an overhead transparency to visually show the correct answers for the activities.	Check for understanding by asking questions when giving directions or assignments in writing.	Show students how statistical reports are compared by using various graphs and visual representations. You may also wish to draw pictures as you talk through the report findings.

<p><b>Evaluation</b></p>	<p>Allow students to show their mastery of the concept of statistical analysis through written reports or assessments, and/or graphic interpretation.</p>	<p>Allow students to orally report what they have learned.</p>	<p>Allow students to use manipulatives or draw pictures in order to visualize what the statistics are reporting. Assessment of learning can also be completed through the development of models to show the particular statistics.</p>
<p><b>The Family and Adult Literacy Connection</b></p> <p>Child's growth chart – Have students figure out if their children are in the average profile. Young children can do the measuring, older children can research average growth gains, and the family can determine the results.</p> <p>Family game night: – By playing checkers, you can have older siblings calculate the percentage or ratio of chances in which a player would win games within a set number of chances.</p> <p>Provide time during class to discuss the importance of looking at statistical reports in the workforce and what they tell us. Also, include how these reports can impact what people perceive regarding the economy of the nation.</p>		<p><b>ESE/ESOL Accommodation</b></p> <p>Allow students to work in small groups and to report out orally rather than in writing. For students who have difficulty in completing multiple activities, shorten the questions and the amount of resources. For example, have students discuss just one survey done in a magazine. Limit the assignment to areas that students have interests or previous experiences, for example top ten lists of songs.</p>	

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### STATS Vocabulary Sheet

Data - observations that have been collected (measurements, survey responses, etc).

Statistics - a collection of methods for planning experiments, obtaining data, and then organizing, summarizing, interpreting, and drawing conclusions based on the data. It is a numerical measurement describing some characteristic of a sample.

Population - the complete collection of all elements (scores, people, measurements, etc) to be studied.

Census - collection of data from every member of the population.

Sample - a sub-collection of members selected from a population.

Mean - most common type of averaging. It is the center of the numbers, found by adding all the values and dividing by the number of values.

Median - the average of the two middle numbers or the middle number.

Mode - the number that occurs most frequently.

Bell curve - normal distribution of data with the mean, median, and mode equal.

Percentile - one of the marks that divide scores into 100 group of 1% each.

Quartile - divides a list into four groups of 25% each.

Standard deviation - tells you how tightly gathered all the numbers are around the middle value.

For all normal distributions, the following rules hold:

- **68%** of the values are within **one standard deviation** of the middle value;
- **95%** of the values are within **two standard deviations** of the middle value; and
- **99.7%** of the values are within **three standard deviations** of the middle value.

Correlation vs. causation - Just because there is an association or correlation between two things, it does not necessarily mean that one causes the other.

Quantitative data - numbers representing counts or measurements.

Qualitative data - data, which can be separated into different categories, that is distinguished by some nonnumerical characteristics such as male/female.

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### **Analyzing the STATS Questionnaires**

#### **Bell Curve Questions**

Which grade occurs most frequently?

What is the mean?

What is the median?

What is the mode?

What is the standard deviation?

Your child (the test score) falls above the 70<sup>th</sup> percentile. What does that mean?

What score is the median and falls in the 50th percentile?

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### **Popular Culture Analysis**

What type of statistical report are you identifying?

What information is reported?

Why was the analysis done?

What occurs most frequently?

What occurs least frequently?

What components are identified?

How is the information represented?

What type of data is reported (quantitative/qualitative)?