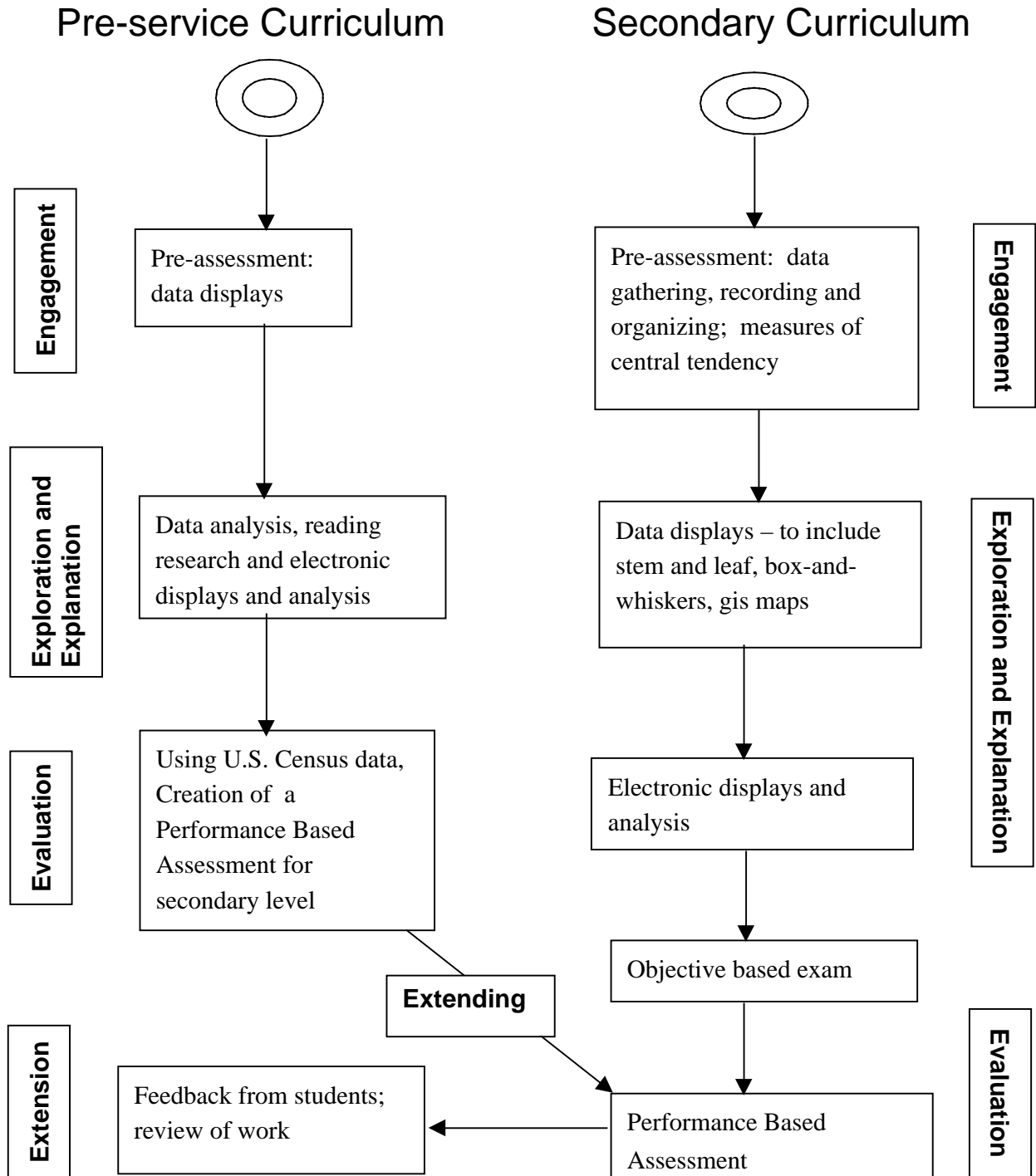


On Your Mark, Get Ready, DO STATISTICS

An intertwined mathematics unit for pre-service elementary teachers and secondary pre-Algebra and Algebra I students.



UNIT TITLE: On Your Mark, Get Ready, DO STATISTICS

Unit goal: This is an intertwined statistics unit that will provide a) instruction and assessment for pre-algebra and Algebra I secondary students and b) math and technology content instruction and assessment and pedagogical design and analysis for pre-service elementary teachers.

Grade Level: 7 – college

General Subject Area(s):

Math content in pre-algebra and algebra at secondary level
Math and education content in pre-service education classes

Minimum time required for the unit:

Secondary: 360 class minutes
College: 225 class minutes and 4 subsequent weeks for project completion.

Concepts learned across all unit modules:

Secondary: data collection, organization, display and analysis
College: Collecting, displaying, analyzing and interpreting quantitative data, development of a performance based assessment.

Standards addressed by unit modules:

Pre-Service Teachers: (PRAXIS):

Elementary Content & Knowledge (0014)

II. Mathematics

Data Organization and Interpretation

—visual displays of quantitative information

—mean, median, mode

Mathematics Curriculum, Instruction, and Assessment (K-5)(0016)

Teaching strategies and activities that will aid in the development, delivery and evaluation of the following:

- Curriculum components – for example, scope and sequence of skills and materials; appropriate materials and technology;

- Problem solving – for example, investigate and understand content; formulate problems from everyday situations; develop strategies applicable to a wide range of problems; verify and interpret results; build student confidence; identify and solve problems that are developmentally appropriate
- Probability and statistics – for example, counting, organizing, representing and interpreting data; intuitive concepts of chance
- Hand-held calculators and computers – for example, justification of use; programs of instruction; appropriate use; use in problem solving and concept development
- Classroom management and motivation – for example, efficient instruction; small group instruction; whole group instruction; atmosphere that encourages questions, conjectures, problem solving, and experimentation
- Analysis of students’ work – for example, what students do correctly; what concepts students are developing; misconceptions and errors; scoring; remediation, and acceleration; use of rubrics
- Use of manipulatives and developmentally appropriate materials; variety and reliability
- Content-specific pedagogy – for example, theories necessary for implementing sound representations of numeric and algebraic concepts

V. Discrete Mathematics and Computer Science

- Use the calculator as a tool to explore patterns, make conjectures, make predictions, make generalizations; know when to use a calculator
- Demonstrate an understanding of basic computer terminology and the roles of hardware and software; use “friendly” software (for example, spreadsheets, instruction packages)

Reading and Language Arts Curriculum, Instruction, and Assessment (K-5)(0016)

- - Teaching strategies and activities
 - Reading: Determining individual reading levels
 - Language acquisition and readiness such as:
 - Drafting – for example, knowledge of audience

- Revising – for example, Praise-Question-Polish; restructuring; deleting and adding information and details; conferencing
- Editing – for example, spell-check; peer or teacher conferencing

Secondary:

MSDE Core Learning Goals:

- 3.1.1 The student will design and/or conduct an investigation that uses statistical methods to analyze data and communicate results.
- 3.1.2 The student will use the measures of central tendency and variability to make informed decisions.
- 3.2.1 The student will make informed decisions and predictions based upon the results of simulations and data from research.

•
MSDE MSPAP Outcomes (Grade 8)

Student will be able to:

Collect, organize, display data for given situations using appropriate displays such as circle graphs, box-and-whisker plots, scatter plots, glyphs

Use data analysis to write an evaluative argument in a real life situation

Determine the best measure of central tendency and calculate it

Technology Standards: <http://www.smcm.edu/msde-pt3/index.htm>
 <http://www.iste.org>

Technology needed in unit modules:

Computers with Internet access and WORD, Excel, CD-ROM,
Blackboard/Jenzbar threaded discussion boards, Statistical Abstract of the U.S.
Graphing calculators, LCD Overhead Display and Graph-Link
Options for probeware and web wacker program

Technology-enhanced instructional strategies employed: finding real data, using Internet access and CD-ROM; using graphing calculators and Excel to display and aid in analysis; possibilities for telecollaboration between preservice teachers and middle school students.

Title of Each Module:

College: #1: Introduction to Data Analysis
#2: Opinions by the Numbers
#3: Designing a Performance Based Assessment for Mathematics

Secondary: #1: Finding Information
#2: Look at What We Found
#3: Electronic Displays and Analysis

Unit Culminating Activity:

Pre-Service: Using U.S. Census data from CD-ROM to construct student materials (worksheets and spreadsheet(s)) for a Performance Based Assessment for pre-algebra and Algebra I students and the administration of the PBA's to middle school students

Secondary: The completion of a performance based assessment which requires students to analyze, interpret, and predict trends in United States populations during the 20th and 21st centuries.

Unit Authors: Dr. John E. August, Mount St. Mary's College
Mrs. Nancy W. Lewis, Frederick County Public Schools
Miss Jennifer Ramult, Mount St. Mary's College

PRE-SERVICE MODULE # 1

Module Title: Introduction to Data Analysis

Estimated time to complete: One 75 minute period

Module objectives:

Students will be able to:

- Select an appropriate display for given data
- Develop and use a rubric/checklist for evaluating graphical displays

Concept(s) learned in this module:

Data Collection, Display and Analysis

Standards addressed in this module (Praxis):

Visual displays of quantitative information, analysis of student work

Technology-enhanced instructional strategies utilized in this module:

Teleresearch, Excel and Graphing Calculators

Module Overview

Components	Brief description of module activities	Student Grouping	Materials/ Technology
Engagement	Students are presented data tables and asked to draw conclusions..."What do you notice"	In pairs	See Teacher Notes
Exploration	Students construct what they feel is the most appropriate graph for the data.	In pairs	Pencil/paper or Spreadsheet See Teacher Notes
Explanation	Students will construct a 4pt-rubric for data display.	Whole class	See Teacher Notes
Extension	Glyphs, Pictographs		
Evaluation	Based on class-generated rubric, students score graphs produced above.	In pairs	

Expected module outcomes:

Students are capable of selecting and creating an appropriate display for data.
Students can create and use a rubric.

Performance-based assessment of module outcomes:

Completed graphs.

TEACHER NOTES:**Engagement:**

The Engagement activity is similar to the introduction provided by class text:
Mathematics for Elementary School Teachers: Exploration by Tom Bassarear.
Data could be obtained from web sites.

Exploration:

Displays listed should include bar, line, line segment, circle, stem-and-leaf, histogram, and box and whiskers. Step, pico- and glyphs would be other possibilities.

Explanation:

A 4-point rubric should include evaluations of title and its connection to data, labels, scaling, appropriate use of axis, shading, and spacing

PRE-SERVICE MODULE # 2

Module Title: Opinions by the Numbers

Estimated time to complete: 75 min class

Module objectives:

Students will be able to:

- Select the best descriptor(s) for a given set of data
- Extrapolate information from an educational research article and explain the use of standard deviation
- Create displays of data (including box and whisker) electronically
- Use electronic tools to compute analysis of data set

Concept(s) learned in this module:

Mean, median, mode, and standard deviation

Standards addressed in this module (Praxis):

Organizing, representing and interpreting data, mean, median and mode, using a computer and user-friendly software.

Technology-enhanced instructional strategies utilized in this module:

Locating current educational research articles on the web, participating in an interactive web based lesson, Excel, Smart Board, graphing calculators and overhead projection device.

Module Overview

Components	Brief description of module activities	Student Grouping	Materials/ Technology
Engagement	Students visit interactive web based lesson (http://www.shodor.org/interactivate/lessons/sml1.html is one suggestion) and answer questions about mean, median and mode. Students locate a web based research article and report on the statistics used in the article.	In pairs	Computer with Internet access
Exploration	Round robin discussion from engagement activities	Whole class	
Explanation	Teacher summary (instruction in) of the concepts learned. Using Excel to compute concepts and construct displays.	Whole class	Excel
Extension	Constructing and using box and whisker plots on a graphing calculator	Individual	Graphing calculators
Evaluation	Completed graph and written analysis of data.	Individual	Word processing & Excel

Expected module outcomes:

Students will be able to effectively use concepts of data display and analysis

Performance-based assessment of module outcomes:

Completion of electronic display and written analysis of data

Teacher Notes:

Students should be familiar with research articles that describe mean values. Hand out copies of research noting standard deviation of data in case this measure of dispersion isn't present in any of their found articles. Another possibility would be to post a chosen article to Janzebar Discussion Board prior to class time.

PRE-SERVICE MODULE #3

Module Title: Designing a Performance Based Assessment

Estimated time to complete:

Seventy-five minute class plus an additional 3.5 weeks for out of class project.

Module objectives:

Students will be able to:

- Access data from CD-ROM
- Determine appropriateness of data for classroom use
- Develop questions for classroom analysis
- Understand what makes a good question
- Organize data for student use

Concept(s) learned in this module:

What it takes to develop a good Performance Based Assessment (PBA)

Standards addressed in this module (Praxis):

See Praxis standards listed in Unit Description

Technology-enhanced instructional strategies utilized in this module:

Use of CD-ROM, Spreadsheets, Graphing Utilities, Smart Board, Web Course Tools, Email

Module Overview

Components	Brief description of module activities	Student Grouping	Materials/ Technology
Engagement	Brainstorming question about value of performance based assessment	Small Group Whole class	See MSDE k-12 site (mdk12.org)
Exploration	Students will participate in an exemplar Performance Based Assessment	Small group	Computer with Excel
Explanation	Students will analyze the five-E process within the exemplar	Small group to whole class	
Extension	Students will construct a PBA based on U.S. census data. The PBA development will include finding appropriate data and developing a problem-solving prompt.	Small group	Computer with net access, CD-ROM, Excel, Word processor, Tele-collaboration
Evaluation	Student's exemplar PBA is Rubric scored.	Small Group	

Expected module outcomes:

A secondary student-ready performance based assessment

Performance-based assessment of module outcomes:

Completion of performance based assessment for secondary students

Teacher Notes:

See the instructional materials at the end of this packet.

SECONDARY MODULE # 1

Module Title: Finding Information

Estimated time to complete: One 90 minute class

Module objectives:

Students will demonstrate competency in analyzing data and communicating their findings.

Concept(s) learned in this module:

Data collection, organization , display and analysis

Standards addressed in this module (K-12):

Maryland State Department of Education Core Learning Goals:

- 3.1.1 The student will design and/or conduct an investigation that uses statistical methods to analyze data and communicate results
- 3.1.2 The student will use the measures of central tendency and variability to make informed conclusions.
- 3.2.1 The student will make informed decisions and predictions based upon the results of simulations and data from research.

Maryland State Department of Education

Maryland School Performance Program (grade 8):

Student will be able to:

Collect, organize, display data for given situations using appropriate displays such as circle graphs, box-and-and-whisker plots, scatter plots, glyphs

Use data analysis to write an evaluative argument in a real life situation

Determine the best measure of central tendency and calculate it

Technology-enhanced instructional strategies utilized in this module:

Graphing calculators, overhead calculator projection device, word processing and importing information, Excel. Opportunities for probeware, use of web wacker.

Module Overview

Components	Brief description of module activities	Student Grouping	Materials/ Technology
Engagement	Pre-assessment activity: Data gathering and recording	Pairs, small group	See Teacher Notes
Exploration	Students organize their collected data	As above	
Explanation	Student groups report to whole class their findings. This will include measures of central tendency . Range, min and max are other suggestions.	As above	
Extension	Data will be used in next lesson. Discuss any problems associated with the data or data collection process.	As above	
Evaluation	Written suggestions to students regarding the information shared...recording method, measure(s) used	As above	

Expected module outcomes:

A heightened sense of proper procedures for collecting and organizing data

Performance-based assessment of module outcomes:

Chart of collected data

Teacher Notes:

The data collection should be very student centered. Almanacs offer a good print source; web sites have weather and sports data; probe ware is optional.

SECONDARY MODULE # 2

Module Title: Look at What We Found!

Estimated time to complete:One 90 minute class period

Module objectives:

Students will select and construct the most appropriate display of data. They will be able to correctly evaluate their work.

Concept(s) learned in this module:

Distinguishing among appropriate displays for data

Standards addressed in this module (K-12):

MSPAP Grade 8: collect, organize and display data

Technology-enhanced instructional strategies utilized in this module:

None necessary Technology uses are addressed in the next module.

Module Overview

Components	Brief description of module activities	Student Grouping	Materials/ Technology
Engagement	Students will brainstorm a list of known ways to display data . They will reach consensus on what they, as a small group, feel is the most appropriate display.	Small group	
Exploration	They will take their data from previous day and construct what they feel is the most appropriate display.	Small group	Paper/pencil
Explanation	Share with whole class their displays	Whole class	
Extension	Develop checklist to rate display	Small group	Paper/pencil
Evaluation	Use of checklist	Individual	

Expected module outcomes:

An appropriate, correct display of collected data and a student developed checklist for evaluation

Performance-based assessment of module outcomes:

Completed display and students' self evaluation of their work

Teacher Notes:

If the teacher is comfortable with students' pencil/paper constructions of displays, then the Exploration and Explanation Steps above may be omitted. The checklist may be used in Module 3 with technology created displays.

SECONDARY MODULE # 3

Module Title: Electronic Displays and Analysis

Estimated time to complete:

Two 45 minutes class periods. This lesson contains two segments (plans for each given in separate 5E format).

Module objectives:

Students will gain competency in electronically constructing displays and analyzing their data.

Concept(s) learned in this module:

Appropriate use of technological tools to display and analyze data

Standards addressed in this module (K-12):

MSPAP (grade 8): Student will be able to:

Collect, organize, display data for given situations using appropriate displays such as circle graphs, box-and-and-whisker plots, scatter plots, glyphs

Use data analysis to write an evaluative argument in a real life situation

Determine the best measure of central tendency and calculate it

Technology-enhanced instructional strategies utilized in this module:

Word Processing, importing graphs and charts into Word Document, Excel

Module Overview

Lesson 1:

Components	Brief description of module activities	Student Grouping	Materials/ Technology
Engagement	Pre-assess students knowledge of uses of graphing calculator – especially using lists and 1 variable statistics analysis	Pairs	Graphing calculators
Exploration	Graphing calculators as a tool for analysis and display—instruction as necessary	Whole class	Graphing calculators
Explanation	Students construct a display of their previously collected (or new) data	Individual	Graphing calculators
Extension	Import displays into Word Document which is their narrative. Use probe ware to gather data.	Pairs	Graphing calculators and computer
Evaluation	Printed informative document with display/analysis	Pairs	Computer

Lesson 2:

Components	Brief description of module activities	Student Grouping	Materials/ Technology
Engagement	Pre-assess students' skills of constructing displays	Individual	Computer with Excel and Word
Exploration	Excel as a tool for analysis and display – instruction as needed	Whole class	As above
Explanation	Practice data sets as noted in previous lesson	Individual	As above
Extension	Importing displays into Word document	Individual	As above
Evaluation	Completed explanatory document	Individual	As above

Expected module outcomes:

The students will be able to independently construct spreadsheets, analyze data with computer or calculator and prepare a well written document explaining their findings.

Performance-based assessment of module outcomes:

A completed word processed document explaining and giving analysis of data. A graph is to be included.

Teacher Notes:

The usual format for a written document is to have the first paragraph explaining the origin of the data and giving specific values such a mean, mode, median, range. The second paragraph would cite how work was done, further analysis and an appropriate of the data. The third paragraph would be a summary/extension of student's thoughts or findings.

Teacher Notes for Pre-Service Module #3

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Class Schedule

The following is a proposed schedule for the project and accompanying timeline for interim assignment completion. Following the schedule is the project narrative which contains a description of the process. The narrative is to be handed out to the students on the initial day.

Day 1: Assignment presented; students choose groups and data to be used.

Day 2: Students have their three written questions in class and trade with another group for revision.

Day 3: Peer Revision group returns the questions (see peer revision sheet#1) to the owners and the owners set up a meeting with coordinator to discuss which question works best. Groups revise, reflect on their questions and create activity.

Day 4: Groups bring in their developed performance based assessment activity to be traded with another group for revision (see peer revision sheet#2).

Day 6: Activities are returned to original groups for final revisions and reflection.

Day 7: Groups turn in their final project in their portfolio.

Project Narrative

So, now you have learned about Performance Based Assessments and the five E style of planning. Now, let's see if you can create your own PBA!

As you have been learning about data analysis and graphing, eighth graders at Thurmont Middle School have been doing the same. Your task is to work in groups of 2-3 people to create a Performance Based Assessment for these eighth graders. Remember to work with others that you know you can get along with and you know will work on this assignment with you.

We will discuss the project and our expectations for your performance based assessment.

Once your group has been formed, go to the US Census site (www.census.gov). To find the data you will want to use for your question, click on "Statistical Abstract" under the "Special Topics" title. Then click on Adobe Acrobat PDF Files. Scroll down to Section 31 20th Century Statistics and click on the numbers to the right of this title. This will take you to the different sets of data you have to choose from to base your question on. When choosing the data you want to use, keep in mind the following:

1. Choose a set of data that is consistent over a long period of time
2. Make sure the data you choose is appropriate for eighth graders, but also interesting for them.
3. While looking through the data, you might want to think about the types of questions that you could ask students.

Choose the set of data that you will base your activity on and post your choice on Blackboard.com. No two groups can use the same set of data, so find 2 or 3 sets of data that you might like to use just in case the one you want is already taken. Once you have posted your topic, go to the server and retrieve the spreadsheet that contains your data. Now you are ready to begin.

You will begin by creating three different questions. One question will have students using one of the following graphs to analyze the data: bar graph, circle graph, stem leaf plot, or histogram. Another question will ask students to use a line graph to analyze data. Finally, the last question will ask students to use a box and whisker plot to analyze the data.

Now your group's three questions will be given to another group to be revised. Each group will revise (see peer revision sheet#1) and attempt to answer another group's three questions. The revision group will decide which graph works best with the data chosen for your question. After your questions have been revised, the revision group will return the questions and your group will then make an appointment with the coordinator to discuss which graph is the best one to use for the data. The question we decide on will be the one you use for your performance based assessment.

Each time you revise your assessment, you will write a reflection explaining why you may have changed something in your question or why you did not change something in your question, depending on what the other group had to say about your question. The second time questions are switched and revised (see peer revision sheet#2), you will actually be switching your activities.

Now your group is ready to create your activity. Using the Five-E format, create your performance-based assessment using your question. The activity should be engaging and guide students to make conclusions about the data that you are using.

Your group will again trade your activities with another group to have your activity revised once more. Your group will make more changes, if necessary, to your activity and write up another reflection for this revision. You will then turn in your final project to me.

The final project will include the following parts in a portfolio:

- Province of the 3 questions/prompts
- Evidence of testing process
- Original data set with table reference number
- All peer view comments
- Reflections on Peer Review Comments
- Final copy of prompt and exemplar response...hard copy and on disk
- Copy of data for students use: hard copy and disk

Peer Revision Sheet #1

Group Members' Names:

Topic of Question:

Data Set for Question:

1. What do you like about this group's question?
2. Is the question appropriate for middle school students?
3. Is there enough data for the question? Will students be able to draw logical conclusions from an analysis of the data set?
4. How is the question worded? Is it easy to understand what you are expected to do for the question?
5. After completing the question, what are your thoughts on the problem? Were you able to answer the question?
6. Is there anything you would change about the question?

Any additional comments you have can be written on the back of this sheet.

Peer Revision Sheet #2

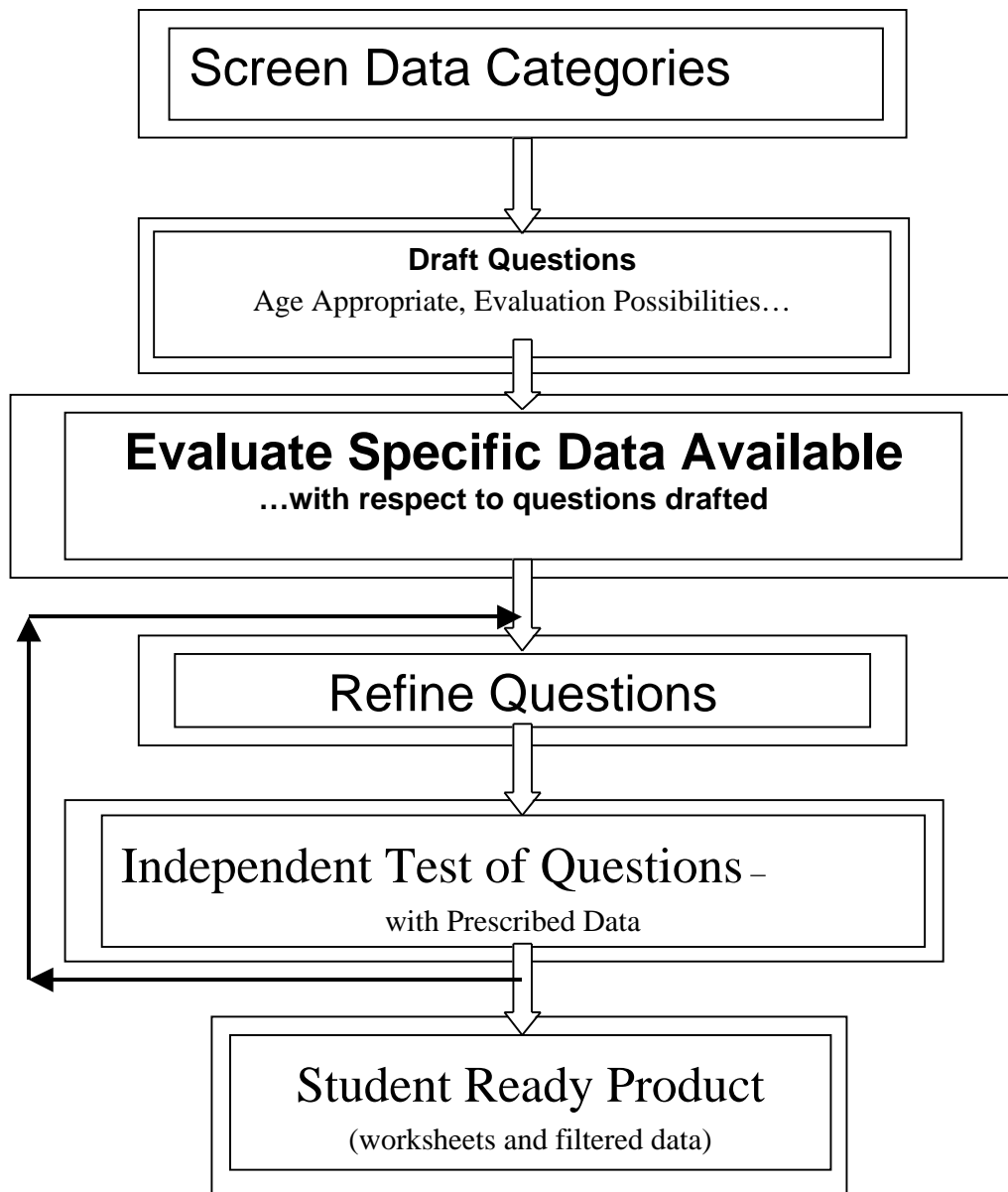
Group Members' Names:

Title of Activity:

1. What do you like about this group's question and activity?
2. How does the activity go about catching the students' attention? (Cite reasons for your answer)
3. Does the group use the Five E's Method of planning the activity? If not, make suggestions as to how the activity can use all five E's.
4. Is there a logical order of questioning that leads students to conclusions and understanding of the data? Explain why.
5. How does the activity effectively assess students' skills in data analysis and graphing? Give specific examples.
6. Would you recommend any other changes to this activity?

Additional Comments: (If more room is needed, please use the back of this sheet.)

PBA Development Process



History of the Performance Assessment Question:

- Original:**
1. Study the age brackets for mothers and fathers in spreadsheet #94 in Vital Folder. What was the average age for a mother and father in 1960? What was it in 1990? Create a line graph for each of the age brackets, showing the change in numbers in each for both the mother and father for the years 1960, 1970, 1975, 1980, 1985, and 1990. Are you surprised by the outcomes? Why? Why do you think the ages for mothers and fathers have or have not changed from 1960-1990?
 2. Study spreadsheet #14 in the Population Folder. Make pie graphs representing the distribution of the population according to age brackets for men and women for the years 1970, 1980, and 1990. Which age brackets have changed the most? Which age brackets have hardly changed? Using the data and your pie graphs, make a prediction as to what you think the distribution will look like in the year 2100. Depending on the age bracket that you predict and support for being the largest in 2100, what might this mean for the United States? What might have to change or improve to accommodate an increase in this age bracket? Remember to justify your predictions with the data and your pie graphs.

After First Revision:

A local news station reported that women are enjoying longer lives than men in society today. Do you think this has always been true since the early 1900's for the United States? Why? Study the adobe acrobat file "sec31". Make a table for the average lifespans for men and women for every ten years, starting with 1930 and ending with 1990. Find the difference in ages for each year. Graph the difference in ages on a line graph. On the x-axis, put each year and on the y-axis put the ages.

- What do you notice about the difference in ages for each year as we get closer to 1990?

- What might have caused the increase in the difference between the average lifespan for a man and the average lifespan for a woman? (Think about what happened in United States History)
- The difference between the ages of men and women is now gradually decreasing. Do you think this will continue to fall? Why or why not?

Final Version: See the Student ready exemplar Performance Based Assessment that follows.

A local radio station recently reported that women are enjoying longer lives than men in society today. Think about what you know about older men and women in your family. Is there anyone that you think is *really* old?

If you came in with some family information about how long some of your great grandparents or other generations lived, you could get some bonus points on this assignment.

After the class discussion and hearing other students talk about older people they know, The Math Curse quickly attacks you because of the life expectancies spreadsheets that you made in pre-algebra class. You decide that setting up a chart and graph would help people look at data and make a decision for themselves about women living longer. You ask Mrs. Lewis if you can search for some data...lucky you! She just happens to have the Statistical Abstract of the United States stored on the school's server...and she recommends the section about 20th Century Statistics to you. Off to the computer lab!

(She just HAPPENS to have these exploratory questions for you, too):

Once you are logged into the computer network, follow the path: EXCEL spreadsheet, open file on public (S) drive, go into in "Mrs. Lewis Geo folder" and find and open the spreadsheet named Life Expectancies.

Look at the table. It shows you the average lifespans for men and women in the United States for every ten years from 1930 to 1990.

- 1) What kind of graph do you think would best display this data?

Why do you think this is the best choice?

- 2) Construct and then print out your graph

- 3) In the space below, construct a table to show the differences in years of life expectancy between the genders for all the years given.

- 4) Construct an Excel spreadsheet of your data table in #3.

- 5) Construct a line graph of the data in the spreadsheet. Why is a line graph the most appropriate style to display the data?

- 6) What do you notice about the differences in the ages for each year as time progresses from 1930 to 1990?

- 7) What might be a reason for the differences you noted in #6?

- 8) Do you think the pattern you observed in #6 will continue to be the same or change? _____ Justify your opinion, citing information from the chart or graph. What would predict the difference will be when the 2000 Census data is released? _____

Task Specific Rubric for Designing a Performance Based Assessment

Mount Saint Mary's College, MA109, Fall, 2000

Elements Scale	Understanding of Problem (Question)	Organization of Data (Math Content)	PBA Questioning Process (Activity Sheet)	Participation in Revisions (Pedagogy)	Appearance of Final Product (Overall Work)
Weight					
4	<ul style="list-style-type: none"> -Clear question -Prompt Appropriate (audience and goal) -Is effective use for problem solving 	<ul style="list-style-type: none"> -Filtered data complete and well organized for student use -Data on disc and hard copy 	<ul style="list-style-type: none"> -Data charts and graph(s) required -Follows 5E's -Uses higher level thinking skills in the sequencing of questions 	<ul style="list-style-type: none"> -Makes timely appts. With mentors -Follows timeline for peer reviews -Portfolio complete 	<ul style="list-style-type: none"> -Uses 12 point, Arial font; provision for student name -Adequate room for student responses -No spelling or grammar errors
3	<ul style="list-style-type: none"> -Prompt is appropriate, but not clear in its expected outcome 	<ul style="list-style-type: none"> -Data available, but not easily usable by students 	<ul style="list-style-type: none"> -Follows 5 E's -Requires display -little evidence of higher level skills -Sequencing needs revisions 	<ul style="list-style-type: none"> -One Inadequate review -Misses >1 timeline deadline -Portfolio is complete 	<ul style="list-style-type: none"> -Not in correct font/point
2	<ul style="list-style-type: none"> -Not an effective use of problem solving strategies 	<ul style="list-style-type: none"> -Data not in usable form or not on disc 	<ul style="list-style-type: none"> -Develops an approach strategy, but it impedes student responses -Missing data display or 5 E's 	<ul style="list-style-type: none"> -Portfolio incomplete in one component -Misses >2 timelines/deadlines 	<ul style="list-style-type: none"> - Inadequate room for student responses (replies or student info)
1	<ul style="list-style-type: none"> -Question attempted, but not reflective of task 	<ul style="list-style-type: none"> -No copy of data 	<ul style="list-style-type: none"> -Numerous inaccuracies that interfere with problem solving process -Missing Data display and 5 E's 	<ul style="list-style-type: none"> -Portfolio missing >1 component 	<ul style="list-style-type: none"> Inadequate response room and incorrect font.

PORTFOLIO CONTENTS CHECK LIST

_____ Province of question/prompt

_____ Evidence of testing process

_____ Original data set with table reference number

_____ All peer view comments

_____ Reflections on Peer Review Comments

_____ Final copy of prompt and exemplar response...hard copy and on disk

_____ Copy of data for students use...hard copy and disk