Performance Based Learning and Assessment Task

Analyzing Data from Peer Survey

I. ASSESSMENT TASK OVERVIEW & PURPOSE:
Student teams will analyze survey results from previous task ("Peer Survey on Current Events" and report results to class.

II. UNIT AUTHOR:
Jerry O. Dawson - Glen Allen High School - Henrico County Public Schools

III. COURSE:
AFDA – Algebra Functions & Data Analysis

IV. CONTENT STRAND:
Data analysis

V. OBJECTIVES:
AFDA.7 The student will analyze the normal distribution. Key concepts include:
   a) characteristics of normally distributed data;
   b) percentiles;
   c) normalizing data, using z-scores; and
   d) area under the standard normal curve and probability.

VI. REFERENCE/RESOURCE MATERIALS:
Class activity handouts based on course textbook (*Algebra, Functions, and Data Analysis – A Virginia Course*. Pearson Custom Publishing.)
   Activity 7.9 "A Switch Decision"
   Activity 7.10 "What is Normal"
   Activity 7.11 "Part-Time Jobs"
   Activity 7.12 "Who Did Better?"

VII. PRIMARY ASSESSMENT STRATEGIES:
The task will be assessed using an "Assessment Checklist" (rubric), incorporating both self-evaluation and teacher evaluation. See checklist below.

VIII. EVALUATION CRITERIA:
Scoring rubric included below. Benchmarks included below.

IX. INSTRUCTIONAL TIME:
The instructional unit will span three weeks. The *additional* class time (approximately two weeks) specifically devoted to this task is as follows:
   Task Introduction: 30 minutes
   Topic Selection: 30 minutes
   Conducting Surveys: 90 minutes
   Analyzing Results: 90 minutes
   Reporting Results: 90 minutes

Analyzing Data from Peer Survey

Strand
Data Analysis

Mathematical Objective(s)
The students will:

- • Interpret mean, median, mode, range, interquartile range, variance, and standard deviation of a univariate data set in terms of the problem's context.
- • Explain the influence of outliers on a univariate data set.
- • Explain ways in which standard deviation addresses dispersion by examining the formula for standard deviation.

Related SOL
AFDA.8 The student will design and conduct an experiment/survey. Key concepts include:

- a) sample size;
- b) sampling technique;
- c) controlling sources of bias and experimental error;
- d) data collection; and
- e) data analysis and reporting.

NCTM Standards

- • Select and use appropriate statistical methods to analyze data
- • Communicate mathematical thinking coherently and clearly to peers, teachers, and others
- • Recognize and apply mathematics in contexts outside of mathematics

Materials/Resources

- • Class activity handouts based on course textbook (Algebra, Functions, and Data Analysis – A Virginia Course. Pearson Custom Publishing.)
    - Activities 7.3 through 7.8 as covered in previous Peer Survey task
    - Activity 7.9 "A Switch Decision"
- • Student laptops with MS Excel and MS PowerPoint
- • Classroom set of graphing calculators

Assumption of Prior Knowledge

- • Interpreting tables and graphs.
- • Tabular and graphical methods of displaying data, including line graphs, bar graphs, column graphs, circle graphs (pie charts).

Introduction: Setting Up the Mathematical Task

- "Today we will continue our journey of turning data into information. Data is just a collection of numbers. Information has meaning that we can understand and apply to draw conclusions or make predictions."
- The teacher will show examples of data vs. information, such as stock tables from the Wall Street Journal in contrast to online charts from Schwab.com.
- The teacher will then provide an overview of the task. In this task, students will work in pairs to more fully analyze the data they obtained in a previous Peer Survey task. Teams work independently to create a data analysis package (MS PowerPoint presentation) using the data obtained from their survey of fellow students on a topic of current interest. The packet should include the following data measures:
  - Frequency Plot
  - Range
  - Mean
  - Standard Deviation
  - Five-number summary (Minimum, Q_1, Median, Q_3, Maximum)
  - Boxplot
- Work on this task will parallel the instructional Unit 7 – Problem Solving with Graphical and Statistical Models, and will last approximately one week. One class period will be devoted to student classwork on this task, supported by additional time outside of class.
- Assessment of the task will be through a scoring rubric. Teams will self-evaluate their work as part of the submission for each deliverable. The teacher will also evaluate each deliverable per the rubric. The student scores and the teacher scores will be weighed equally to determine the final task grade.
- The teacher will show sample benchmarks for the team presentations.

Student Exploration

Small Group Work

- Students will work in pairs to complete their data analyses using previously obtained survey data. Teams will have access to their class notes and previous examples.
- Students will be expected to utilize MS Excel and MS PowerPoint to complete this task.
- Students will be expected to draw conclusions from the data measures that they analyze.

Monitoring Student Responses

- As students work, the teacher is available to answer questions and provide coaching as needed.

Task Summary/Closure

- Final oral presentations are made during a dedicated class session.

Assessment List and Benchmarks

<u>Assessment Checklist</u>

Team Members: _____

See Scoring Rubric for scoring descriptions.

Content	Possible Points	Team Score	Teacher Score
Frequency distribution (histogram)	10		
Range	10		
Mean	10		
Standard Deviation.	10		
Five-Number Summary	10		
Box Plot	10		
Overall Conclusions	10		
Presentation	Possible Points	Team Score	Teacher Score
Written presentation + Submitted on time + MS PowerPoint soft- and hard-copies + Neat & professional product + Computer-generated text, charts and graphics throughout + Completed self-assessment included in back-up	15		
Oral presentation + Serious & professional delivery + Completed within allotted time (5 minutes without questions). + Team members equally involved + Audience questions addressed effectively	15		
	Possible Points	Team Score	Teacher Score
Task Total	100		

Scoring Rubric

Content	10 Points	8 Points	6 Points	4 Points	2 Points
Frequency distribution (histogram)	Item included, complete, and accurate	Item included, mostly complete, and mostly accurate	Item included, but partially complete or partially accurate	Item included, but partially complete or mostly inaccurate	Item significantly incomplete or innacurate
Range	Item included, complete, and accurate	Item included, mostly complete, and mostly accurate	Item included, but partially complete or partially accurate	Item included, but partially complete or mostly inaccurate	Item significantly incomplete or innacurate
Mean	Item included, complete, and accurate	Item included, mostly complete, and mostly accurate	Item included, but partially complete or partially accurate	Item included, but partially complete or mostly inaccurate	Item significantly incomplete or innacurate
Standard Deviation	Item included, complete, and accurate	Item included, mostly complete, and mostly accurate	Item included, but partially complete or partially accurate	Item included, but partially complete or mostly inaccurate	Item significantly incomplete or innacurate
Five-Number Summary	Item included, complete, and accurate	Item included, mostly complete, and mostly accurate	Item included, but partially complete or partially accurate	Item included, but partially complete or mostly inaccurate	Item significantly incomplete or innacurate
Box Plot	Item included, complete, and accurate	Item included, mostly complete, and mostly accurate	Item included, but partially complete or partially accurate	Item included, but partially complete or mostly inaccurate	Item significantly incomplete or innacurate
Overall Conclusions	Item included, complete, and accurate	Item included, mostly complete, and mostly accurate	Item included, but partially complete or partially accurate	Item included, but partially complete or mostly inaccurate	Item significantly incomplete or innacurate
Presentation	15 Points	12 Points	9 Points	6 Points	3 Points
Written presentation + Submitted on time + MS PowerPoint soft- and hard-copies + Neat & professional product + Computer-generated text, charts and graphics throughout + Completed self-assessment included in back-up	100% of required elements present	80% of required elements present	60% of required elements present	40% of required elements present	20% of required elements present
Oral presentation + Serious & professional delivery + Completed within allotted time (5 minutes without questions). + Team members equally involved + Audience questions addressed effectively	100% of required elements present	80% of required elements present	60% of required elements present	40% of required elements present	20% of required elements present

- Hypothetical Student Benchmark – Written/Oral Presentation (PowerPoint slides)

Data Analysis:
Facebook Friends

Team Members: Alli Jabra & Jim Autry

Survey Overview

- We wanted to know if the number of Facebook friends was different for Freshmen, Sophomores, Juniors, and Seniors at Glen Allen High School

Our Survey

We asked 30 random* students in each class:

1. How would you classify your Facebook use:
   a) No account/Never use it
   b) Light use (on FB a couple of times a week or less)
   c) Medium use (on FB once a day or so)
   d) Heavy use (on FB multiple times a day)
2. How many Facebook friends do you have right now?
3. How many *real* friends do you have right now?

* - See Random Sampling explanation

Juniors Use FB Most

Percent reporting various levels of FB usage by class

FB Friends

	Freshmen	Sophomores	Juniors	Seniors
Range	305	361	435	502
Mean	148	290	312	378
StdDev	111	128	140	157
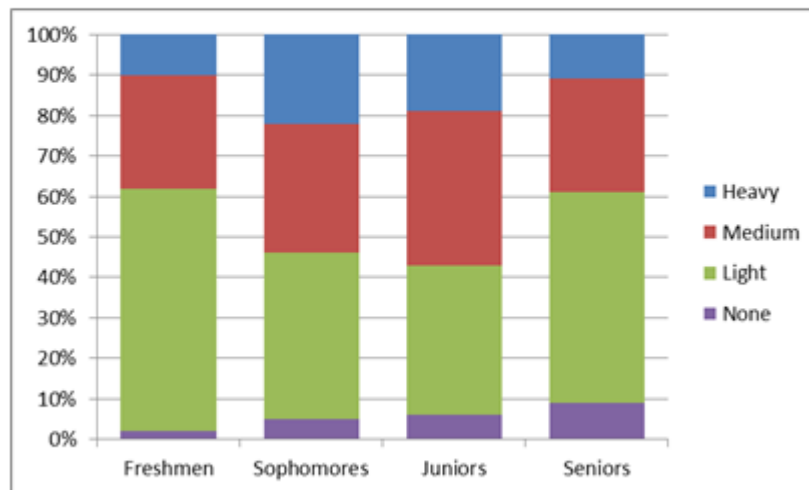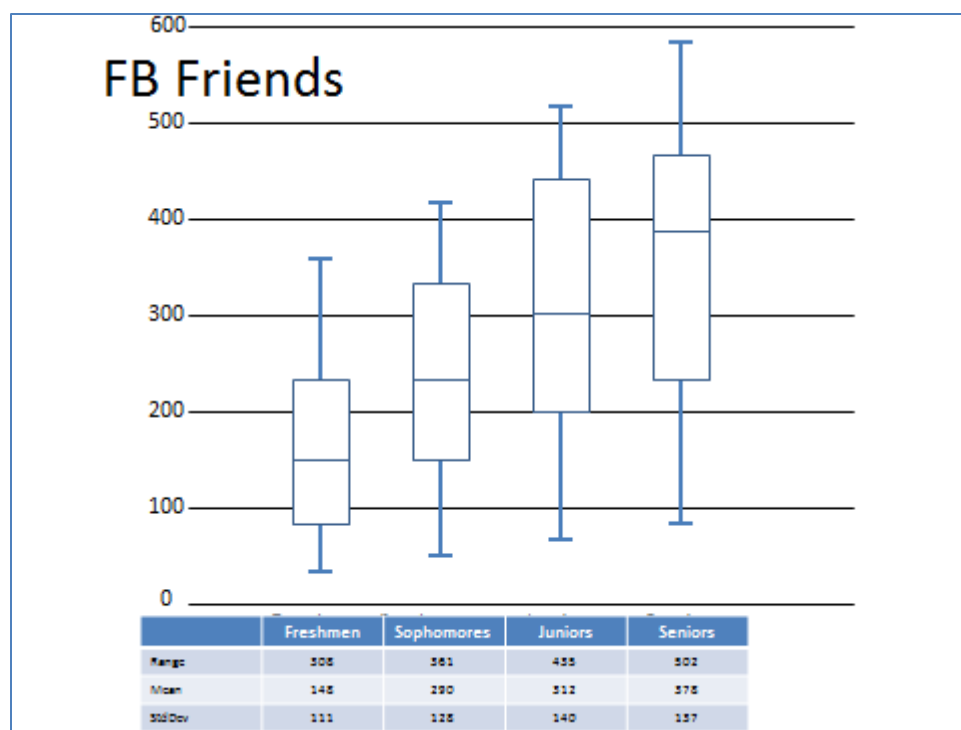
Conclusions

- Senior have more FaceBook friends than other classes.
  - Higher Max
  - Higher Q_1
  - Higher Median
  - Higher Q_2
  - Higher Min
  - Higher Mean and Larger Range