

Performance Based Learning and Assessment Task

Peer Survey on Current Events

I. ASSESSMENT TASK OVERVIEW & PURPOSE:

Student teams will design and conduct a survey on a topic of current interest, 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.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.

VI. REFERENCE/RESOURCE MATERIALS:

Class activity handouts based on course textbook (*Algebra, Functions, and Data Analysis – A Virginia Course*. Pearson Custom Publishing.)

Activity 7.3 “The Class Survey”

Activity 7.4 “Class Survey Continued”

Activity 7.5 “Sampling a Population”

Activity 7.6 “Highway Proposal—Yes or No?”

Activity 7.7 “Statistical Survey”

Activity 7.8 “What’s the Cause”

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 four 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

Peer Survey on Current Events

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Data Analysis

Mathematical Objective(s)

The students will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to:

- Select a data collection method appropriate for a given context.
- Investigate and describe sampling techniques, such as simple random sampling, stratified sampling, and cluster sampling.
- Determine which sampling technique is best, given a particular context.
- Plan and conduct an experiment or survey. The experimental design should address control, randomization, and minimization of experimental error.
- Design a survey instrument.

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

- Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them
- 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.)
 - Activity 7.3 “The Class Survey”
 - Activity 7.4 “Class Survey Continued”
 - Activity 7.5 “Sampling a Population”
 - Activity 7.6 “Highway Proposal—Yes or No?”
 - Activity 7.7 “Statistical Survey”
 - Activity 7.8 “What’s the Cause”
- 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

- To activate student engagement in this task, the teacher will show sample survey results from a collection of current media publications, and facilitate a whole-class discussion of the various topics and the conclusions that can be drawn from the data communicated (and especially the methods used).
- In this task, students will work in pairs to design and conduct a peer survey on a topic of current interest, report the survey results to the class, and submit their work for consideration to be published in the Glen Allen High School *Pawprint* on-line newspaper. This task will lead to a follow-on task, where the data will be more fully analyzed using statistical techniques from upcoming units.
- Work on this task will parallel the instructional Unit 7 – Problem Solving with Graphical and Statistical Models, and will last approximately six weeks. A general timetable is as follows:
 - Week One: Introduction and topic selection
 - Week Two: Survey Design
 - Week Three: Sampling Plan
 - Week Four: Conduct Surveys
 - Week Five: Analyze findings and prepare results
 - Week Six: Communicate results
- Intermediate milestone “deliverables” will occur weekly to accompany this timetable.
- 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 final results presentations (which incorporate the various milestone deliverables).
- As the instructional unit progresses, time will be spent during each lesson to connect the lesson objectives to the survey project and the specific milestone deliverables that are due.
- To kick-off student thinking on this task, the following prompts will be discussed:
 - What current topics interest you, and would also interest *Pawprint* readers?
 - How could data help tell a story or enlighten some current situation?
 - What hypothesis could you make about the situation that data could support (or not)?

Student Exploration

Monitoring Student Responses

- Teams work independently to create weekly deliverables to address scoring rubric requirements. Each milestone delivery is a simple status check submitted by each team. See templates, below.
- With each milestone delivery, teacher provides feedback and guidance to each student team. Students are able to incorporate feedback into final results. General comments/feedback is discussed in whole-group settings during normal class time. Help to individual teams is provided during designated help hours as needed.
- Task Summary/Closure: Final oral presentations are made during a dedicated class session.

Milestone Delivery Status Updates

Topic Selection Status Update

Team Members: _____

Survey Topic: _____

Why is this relevant to *Pawprint* readers?

Why is this topic robust enough for this survey task as well as the statistical analysis?

Approved: _____ Not Approved: _____

Survey Design Status Update

Team Members: _____

Survey Topic: _____

Survey questions (include data measure of interest for each question):

1)

2)

3)

Approved: _____ Not Approved: _____

Sampling Plan Status Update

Team Members: _____

Survey Topic: _____

Who are you sampling? Why is the sample size sufficiently large for the chosen topic and the data to be analyzed?

Why is the sample sufficiently random (free from bias) ?

Approved: _____ Not Approved: _____

Assessment List and Benchmarks

Assessment Checklist

Team Members: _____

See Scoring Rubric for scoring descriptions.

Topic Selection	Possible Points	Team Score	Teacher Score
Proposed topic is relevant to <i>Pawprint</i> readers.	5		
Proposed topic is robust enough to satisfy the requirements of this survey task and the statistical analysis task to follow.	5		
Survey Design	Possible Points	Team Score	Teacher Score
Survey design lists at least three appropriate questions that fit the topic.	5		
Survey design details the intended data that will be analyzed from the question responses.	5		
Sampling Plan	Possible Points	Team Score	Teacher Score
Plan includes an explanation on why the sample size is sufficiently large for the chosen topic and the data to be analyzed.	5		
Plan includes an explanation on why the sample is sufficiently random (free from bias).	5		
Written Survey Results	Possible Points	Team Score	Teacher Score
Actual survey questions match survey design, or adequate justification provided for any revisions.	5		
Actual survey samples follow sampling plan, or adequate justification provided for any deviations.	5		
Results data presented in both written and graphical form. Survey results meaningfully explained and conclusions stated.	10		
Graphs include: Graph title Axes labeled and appropriately labeled Graph type is appropriate for the data	10		
Results are neat and professional (computer generated and printed)	10		
Oral Results Presentation	Possible Points	Team Score	Teacher Score
All team members participate evenly in oral presentation.	10		
Oral presentation is professional and completed within allotted time (5 minutes without questions).	10		
Team effectively addresses audience (including teacher) questions.	10		
	Possible Points	Team Score	Teacher Score
Task Total	100		

Scoring Rubric

Topic Selection	5 Points	4 Points	3 Points	2 Points	1 Point
Proposed topic is relevant to <i>Pawprint</i> readers.	Topic is current (news-worthy in the last 30 days) or of timeless relevance to all high-school students or teachers	Topic is current (news-worthy in the last 90 days) or of timeless relevance to majority of high-school students or teachers	Topic is relevant to subset of high-school students or teachers	Topic is relevant to niche of high-school students or teachers	Topic not approved
Proposed topic is robust enough to satisfy the requirements of this survey task and the statistical analysis task to follow.	Team explanation of topic depth fully convincing	Team explanation of topic depth partially convincing	Team explanation of topic depth partially convincing	Team explanation of topic depth convincing with reservation	Topic not approved
Survey Design	5 Points	4 Points	3 Points	2 Points	1 Point
Survey design lists at least three appropriate questions that fit the topic.	Design includes three or more appropriate survey questions that fit the topic	Design includes two appropriate survey questions that fit the topic	Design includes one appropriate survey questions that fit the topic	Design includes no appropriate survey questions that fit the topic	Design includes no survey questions
Survey design details the intended data that will be analyzed from the question responses.	Design fully details the intended data to be analyzed	Design mostly details the intended data to be analyzed	Design partially details the intended data to be analyzed	Design does not detail the intended data to be analyzed	Design does not include intended data
Sampling Plan	5 Points	4 Points	3 Points	2 Points	1 Point
Plan includes an explanation on why the sample size is sufficiently large for the chosen topic and the data to be analyzed.	Sample size fully justified using appropriate content knowledge	Sample size mostly justified using appropriate content knowledge	Sample size partially justified using appropriate content knowledge	Sample size incorrectly justified with content knowledge	Sample size not justified
Plan includes an explanation on why the sample is sufficiently random (free from bias).	Sample randomness is fully justified using appropriate content knowledge	Sample randomness mostly justified using appropriate content knowledge	Sample randomness partially justified using appropriate content knowledge	Sample randomness incorrectly justified with content knowledge	Sample randomness not justified
Written Survey Results	5 Points	4 Points	3 Points	2 Points	1 Point
Actual survey questions match survey design, or adequate justification provided for any revisions.	100% match to plan or deviations fully justified	80% match to plan or deviations fully justified	60% match to plan or deviations fully justified	40% match to plan or deviations fully justified	20% match to plan or deviations fully justified
Actual survey samples follow sampling plan, or adequate justification provided for any deviations.	100% match to plan or deviations fully justified	80% match to plan or deviations fully justified	60% match to plan or deviations fully justified	40% match to plan or deviations fully justified	20% match to plan or deviations fully justified
Written Survey Results	10 Points	8 Points	6 Points	4 Points	2 Point
Results data presented in both written and graphical form. Survey results meaningfully explained and conclusions stated.	All required elements included.	80% of required elements included.	60% of required elements included.	40% of required elements included.	20% of required elements included.
Graphs include: Graph title Axes labeled and appropriately labeled Graph type is appropriate for the data	All required elements included.	80% of required elements included.	60% of required elements included.	40% of required elements included.	20% of required elements included.
Results are neat and professional (computer generated and printed)	Written results computer-generated in color	Written results computer-generated in black and white.	Written results created by hand neatly and in color on matching paper	Written results created sloppily by hand and submitted on non-matching paper	Written results created sloppily by hand and submitted on torn (spiral notebook) or non-matching paper
Oral Results Presentation	10 Points	8 Points	6 Points	4 Points	2 Point
All team members participate evenly in oral presentation.	Presentation minutes practically even between all team members	Presentation minutes are noticeably unbalanced, yet all members participate	Presentation minutes significantly unbalanced, or one member has negligible role	Two members deliver entire presentation	One member delivers entire presentation
Oral presentation is professional and completed within allotted time (5 minutes without questions).	Business demeanor maintained throughout presentation. No time overage.	Minor lack of business demeanor or presentation in excess of 5 minutes	Frequent lack of business demeanor or presentation in excess of 7 minutes	Significant lack of business demeanor or presentation in excess of 9 minutes	Lack of business demeanor throughout presentation or presentation in excess of 10 minutes.
Team effectively addresses audience (including teacher) questions.	All questions addressed accurately and completely	80% of questions addressed accurately and completely	50% of questions addressed accurately and completely	25% of questions addressed accurately and completely	Team unable to address any questions adequately.

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



Peer Survey:
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

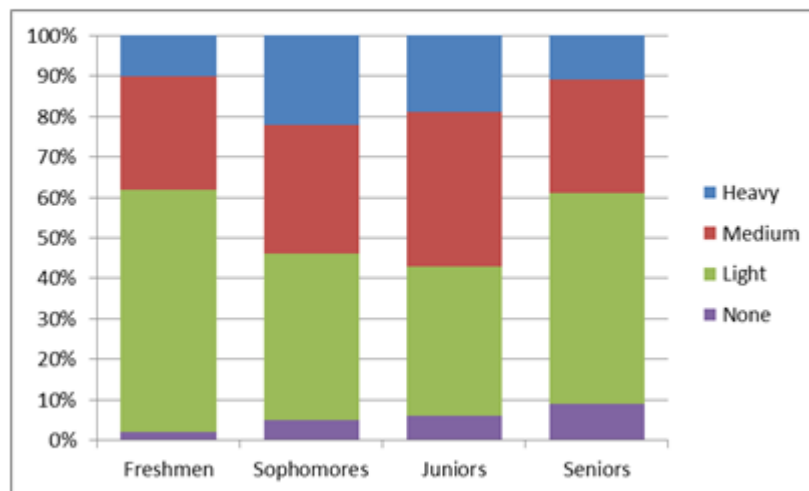
We asked 30 random* students in each class:

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

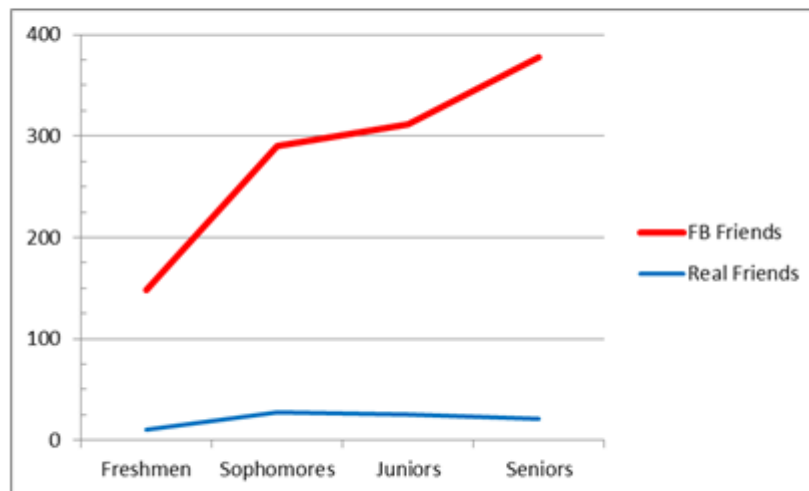
Juniors Use FB Most

Percent reporting various levels of FB usage by class



Seniors Have More “Friends”

Mean number of FB friends and Real friends by class



Conclusions

- FB use peaks during Junior year.
- Senior add many new friends as their world starts to expand beyond high school.
- The number of FB friends and “real” friends are very different for all classes.

Random Sampling

- Mr. Dawson obtained a roster of all students by grade level.
- We generated four lists of 30 random numbers using the RANDBETWEEN function in MS Excel. Mr. Dawson then matched these to student names on the rosters.
- We then tracked down these students for our survey.

