

Performance Based Learning and Assessment Task

PFamily PHeud: An Exploration in Surveys

I. ASSESSMENT TASK OVERVIEW & PURPOSE:

Students will design and conduct a survey featuring their fellow student's responses to various questions. Students will compile top responses and then compete with their classmates to guess those top responses in a format similar to Family Feud.

II. UNIT AUTHOR:

Gretchen Shaw, Patrick Henry High School, Hanover County, Virginia.

III. COURSE:

Algebra Functions and Data Analysis (AFDA)

IV. CONTENT STRAND:

Probability and Statistics

V. OBJECTIVES:

The learner will be able to identify sample size and sampling technique, control sources of bias, and collect, analyze and report data.

VI. REFERENCE/RESOURCE MATERIALS:

Students may first need to view clips of Family Feud from the television show's website (<http://www.familyfeud.com/>) to understand what they are collecting and analyzing data for. Students will need access to their school's population in order to conduct multiple surveys, completed either in a paper/pencil format, or in an electronic format. The name of the project/competition can be changed to reflect the name of each individual school or mascot (ex. Patriots Feud). Students may also need to access websites to create and collect data for their surveys including [surveymonkey.com](http://www.surveymonkey.com), google.com/forms, or a QR code generator website.

VII. PRIMARY ASSESSMENT STRATEGIES:

Students will be assessed on their ability to design and conduct a survey within their school. For each survey conducted, students will provide an overview of how data was collected, how bias was minimized, the results gathered, and a reflection for improvement. Students can grade their data collection themselves using the same rubric the teacher will use for grading. Accommodations can be made to adjust the group size (individual survey vs. group less than 5) and to adjust for available school population (25 people surveyed vs. 100 people surveyed).

VIII. EVALUATION CRITERIA:

The Evaluation Form and benchmarks of exemplary work are attached in the lesson plan.

IX. INSTRUCTIONAL TIME:

Initial instruction on surveys can be completed in one 90 minute block. Data collection can be given a time frame for completion (up to one week, will require time outside of class). Data analysis and preparation for grading/presentations can be completed in one 90 minute block. Presentation/completion of PFamily PHeud can be completed in 45 minutes (half of a 90 minute block).

PHamily PHeud: An Exploration in Surveys

Strand

Algebra Functions and Data Analysis, Data Analysis

Mathematical Objective(s)

After completing this activity, students will be able to design and conduct a survey. They will identify sample size and sampling technique, control sources of bias, and collect, analyze and report on data while working with the sample population in their schools.

Related SOL

- AFDA. 8 The student will design and conduct an experiment/survey. Key concepts include:
 - 8a (sample size),
 - 8b (sampling technique)
 - 8c (controlling sources of bias and experimental error)
 - 8d (data collection)
 - 8e (data analysis and reporting)

NCTM Standards

- Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.

Materials/Resources

Students will need a means of completing their surveys, either paper/pencil or electronic format. If electronic surveys are utilized, students may need access to websites similar to BlackBoard, SurveyMonkey, Google Forms, or a QR code generator. Teachers may need to seek prior approval from their principals for students to collect data from the school population. Students will need a copy of the questionnaire and rubric used for grading their data collection. Students will also need a standardized form for their data collection to be used as sample questions for the end of unit competition.

Assumption of Prior Knowledge

- Students should have a working understanding of surveys. This should include knowledge of sample size, sampling techniques, bias, eliminating/minimizing bias, data collection, data analysis and the reporting of data.
- Students should be able to summarize their initial plan for data collection and how close to their plan the actual data collection was.
- Students should be able to discuss their sample and why a specific group was/was not targeted.
- Students should be able to discuss how they avoided bias.
- Students should be able to reflect on their data collection process, explaining what changes could be made in the future to lead to more concise answers.
- Students should be able to discuss how their survey results may or may not be representative of the population outside the walls of their school.

Introduction: Setting Up the Mathematical Task

- In this activity, students will design and collect a survey featuring the responses of their fellow classmates. Questions will be created, samples will be decided, biases will be reduced, data will be analyzed and the results will be incorporated into a game show type of competition.

- This entire activity will require 2.5 (90 minute) blocks of instructional time in addition to time outside of class dedicated to collecting data. One block of class time is required to teach the basis of surveys, one block to analyze and prepare data for presentation, and half a block to complete the PHamily PHeud competition.
- Teachers should introduce the activity as an opportunity for students to find out more about the likes and dislikes of their fellow classmates, and even the adults in their school.
- The culminating activity will be a classroom competition similar to Family Feud; students may need to view clips of the show if they are unfamiliar with it.
- The teacher should challenge students to come up with a list of questions that could elicit a variety of responses from their fellow classmates or adults in their building.
- Once students have come up with their questions, they need to work on the wording of their questions in order to minimize or eliminate any bias that may exist in the wording of the survey question.
- Students will then need to decide on their targeted audience (ex. freshman, female teachers, students in advanced PE classes) and reflect on any bias that may be present within the targeted audiences' responses.
- At the teacher's discretion, students may work in groups to complete the initial questions on the PHamily PHeud Organization sheet.
- The questions posed to the students will require them to apply their knowledge of survey related vocabulary covered in previous lessons.
- After the students have completed their organization plan, they should be given an adequate amount of time to collect the data necessary for their survey.
- Once the data collection period has passed, students will analyze their data during class time, compiling it into a standardized Data Analysis form that can be easily used during the PHamily PHeud competition.

Student Exploration

This activity is designed to be completed after students have learned the basics of surveys. Teachers can choose to have students work as individuals or in small groups to collect and analyze the survey data.

Individual/Small Group Work

- Students will complete the initial worksheet entitled Organization after a class discussion about the activity, overview of expectations and time frame.
- Students will carry out their plan for collecting data, returning with their results within the specified time frame.
- Students will complete the worksheet entitled Data Analysis, analyzing their responses and reflecting on their experience. Students will also complete the self-evaluation checklist before submitting all work.

Whole Class Sharing/Discussion

- Students will present their survey findings in the form of a class competition modeled after Family Feud. Teachers will have to organize teams and competition so that a team does not have to answer questions about their own survey. Teachers may also need to provide clarification on how tied responses are to be recorded on the data analysis sheet.

Student/Teacher Actions:

- Students will apply what they have learned about surveys in order to plan and carry out a survey. They will also analyze their data and reflect on the process.
- Teachers will facilitate class discussions while redirecting students to the task at hand and providing support and ideas when students get stuck.

- Teachers may need to remind students to be flexible in their plans for data collection, not waiting until the last minute to conduct their surveys in case of unforeseen circumstances (weather cancellations, assemblies, field trips).
- Teachers may need to research and approve websites the students suggest for data collection.

Monitoring Student Responses

- Students will communicate their new knowledge and thinking by successfully planning and conducting a survey.
- Students will communicate with each other through cooperative group work, collecting survey responses from peers not in their class, and the analysis of the data collected.
- Clarification will be gained through questions posed and answer by the teacher, a student referencing their notes, or a student utilizing online resources.
- Teachers will assist students who have difficulties by providing sample survey questions, suggesting a basic plan for data collection, and redirecting groups to on task discussions about their surveying process.
- Teachers can extend the material by having students discover, report on, or take part in surveys that they encounter in their communities.
- Summaries of the activity will take part in two phases. First students will analyze their data and reflect on the process as they complete the Data Analysis worksheet. Then, students will have the opportunity to share their findings with fellow students in a friendly competition modeled after Family Feud.
- Evidence of students' knowledge will be found in their answers on the Organization and Data Analysis worksheets, their successful completion of the data collection, and their sharing of their findings.

Assessment List and Benchmarks

- Student work habits for this PBA include planning, carrying out and analyzing the results of a survey. Students will also participate in a game show style competition to guess the results of each others surveys.
- Student Worksheet 1: Organization. The questions listed on this page will guide students in the selection of a survey question as well as well as a targeted audience. Students will also investigate potential bias and ways to avoid it.
- Student Worksheet 2: Data Analysis. Students will use this worksheet to compile top responses to their survey question and reflect on their experience.
- Student Worksheet 3: Evaluation Form: Students will use this worksheet to self-assess their PBA, making sure all aspects of the data collection process, analysis and reflection have been completed.
- Benchmark: Hypothetical Student work for Organization
- Benchmark: Hypothetical Student work for Data Analysis.
- Feedback can be provided informally as students are working and formally on the provided checklist.

Organization

1. What is your initial survey question?

2. How can you rephrase your question to reduce or eliminate bias created by the wording of the question?

3. Who is your target audience? How many people will you survey?

4. What bias may be present in this audience's responses, if none explain why?

5. Will your results have predictive validity for other high schools in the county? Other high schools in the state? All people in Virginia? All people in the United States? Why or why not?

6. When and where will you collect data?

7. Will this form of data collection create a bias in those who are able to participate? Why or why not?

8. List at least one difficulty you anticipate in your data collection. What is your plan for overcoming the difficulty?

Data Analysis

1. What was the exact wording of your survey question?

2. Complete the following chart to list the most common responses.

<u>Top Response 1</u>	<u>Number of Responses</u>	<u>Top Response 6</u>	<u>Number of Responses</u>
<u>Top Response 2</u>	<u>Number of Responses</u>	<u>Top Response 7</u>	<u>Number of Responses</u>
<u>Top Response 3</u>	<u>Number of Responses</u>	<u>Top Response 8</u>	<u>Number of Responses</u>
<u>Top Response 4</u>	<u>Number of Responses</u>	<u>Top Response 9</u>	<u>Number of Responses</u>
<u>Top Response 5</u>	<u>Number of Responses</u>	<u>Top Response 10</u>	<u>Number of Responses</u>

3. What surprises did you encounter while collecting your data? Did participants provide unusual responses or were there issues with your data collection process?

4. If you were to carry out this survey again, what changes would you make? Why would you make these changes?

5. If you were to complete this survey in another Virginia high school, what changes would you have to make?

Evaluation Form

Question	Self Evaluation	Teacher Evaluation	Comments
1. Did I list an initial survey question? (2 pts)			
2. Did I rephrase my survey question to eliminate bias? (2pts)			
3. Did I list a target audience? (2pts)			
4. Did I analyze my target audience for potential bias? (2pts)			
5. Did I discuss the predictive validity of my survey? (2pts)			
6. Did I explain my plan for collecting data? (2pts)			
7. Did I list any anticipated participation bias? (2pts)			
8. Did I collect all of my data? (25 points)			
9. Did I complete my data analysis chart for inclusion in PHamily PHeud? (10 points)			
10. Did I compete in PHamily Feud? (1 pt)			
Total Points	/50	/50	

Benchmark – Hypothetical Student Answers

PHamily PHeud

Name _____

Organization

1. What is your initial survey question?

Do you think that pepperoni pizza is the best kind of pizza to order?

2. How can you rephrase your question to reduce or eliminate bias created by the wording of the question?

What is your favorite topping to order on your pizza?

3. Who is your target audience? How many people will you survey?

High school students at PH, 100 students

4. What bias may be present in this audience's responses, if none explain why?

They might only list their favorite topping on school pizza, they might not consider delivery pizza or bake at home pizza

5. Will your results have predictive validity for other high schools in the county? Other high schools in the state? All people in Virginia? All people in the United States? Why or why not?

The results will have predictive validity for the other county high schools and high schools in the state because we are all in similar settings and will automatically think about the toppings available to us at school. There will not be predictive validity for people in VA or people in the US because there will be a wider range of ages to account for as well as different types of toppings available in each different region.

6. When and where will you collect data?

When: During the school day, including before school, study halls and lunch.

Where: In the commons, cafeteria, library and study hall classrooms.

7. Will this form of data collection create a bias in those who are able to participate? Why or why not?

No, data will be collected from a variety of students at a variety of times, eliminating potential bias and exclusion of those who leave early/come in late, those who do not eat lunch in the cafeteria, and those who do not have a study hall

8. List at least one difficulty you anticipate in your data collection. What is your plan for overcoming the difficulty?

Students may want to provide multiple toppings for their favorite pizza instead of just one topping. I will change the wording of the question to make it understood that I am just interested in one favorite topping.

Benchmark – Hypothetical Student Answers

PHamily PHeud
Data Analysis

Name _____

1. What was the exact wording of your survey question?

What is your single favorite topping to eat on your pizza?

2. Complete the following chart to list the most common responses.

<u>Top Response 1</u> Pepperoni	<u>Number of Responses</u> 37	<u>Top Response 6</u> Ham	<u>Number of Responses</u> 6
<u>Top Response 2</u> Mushroom	<u>Number of Responses</u> 17	<u>Top Response 7</u> Black Olives	<u>Number of Responses</u> 3
<u>Top Response 3</u> Cheese	<u>Number of Responses</u> 15	<u>Top Response 8</u> Anchovies	<u>Number of Responses</u> 2
<u>Top Response 4</u> Onion	<u>Number of Responses</u> 13	<u>Top Response 9</u>	<u>Number of Responses</u>
<u>Top Response 5</u> Sausage	<u>Number of Responses</u> 7	<u>Top Response 10</u>	<u>Number of Responses</u>

3. What surprises did you encounter while collecting your data? Did participants provide unusual responses or were there issues with your data collection process?

The amount of time people took to answer; some people had to think for a minute before answering.

4. If you were to carry out this survey again, what changes would you make? Why would you make these changes?

I would make the survey broader, taking into consideration multiple combinations of toppings. This would allow more accurate responses to be given and more accurate data to be collected.

5. If you were to complete this survey in another Virginia high school, what changes would you have to make?

I wouldn't have to make any changes if I completed this survey in another high school. My question is not specific to my school and pizza is available everywhere.