Performance Based Learning and Assessment Tasks

**Consumer Reporting Task: Opinion Poll**

**ASSESSMENT TASK OVERVIEW & PURPOSE:**
- The purpose of this activity is to assess the students’ ability to use statistical thinking. Students will have to design an experiment, collect data from the experiment, and analyze the data to make predictions.

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**COURSE:**
Algebra Functions and Data Analysis

**CONTENT STRAND:**

ALGEBRA, FUNCTIONS AND DATA ANALYSIS
STANDARD 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.

**OBJECTIVES:**
Students will:
- Organize and implement a survey.
- Collect and analyze data from the survey.
- Analyze descriptive statistics to determine the implications for the real-world situations from which the data derive.
- Design a survey instrument.
- Given a plan for a survey, identify possible sources of bias, and describe ways to reduce bias.
- Write a report describing the experiment/survey and the resulting data and analysis.

**REFERENCE/RESOURCE MATERIALS:**
- Graphing Calculators
- Pencils
- Chart paper
- Colored pencils or markers
- Graph paper
- Rulers
- Computer and software: Microsoft Word, Microsoft Excel
- Copies of the student recording sheet for the second activity

**PRIMARY ASSESSMENT STRATEGIES:**

The task includes an assessment component that performs two functions:
1. for the student it will be a checklist and provide a self-assessment and
2. for the teacher it will be used as a rubric.

**EVALUATION CRITERIA:**

Students will complete the tasks found in the attached activity. Student performance on the tasks will be assessed by using the attached rubric(s).

**INSTRUCTIONAL TIME:** Approximately two 90 minute class periods
Consumer Reporting Tasks

Strands
ALGEBRA I
ALGEBRA, FUNCTIONS AND DATA ANALYSIS
STANDARD 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.

Mathematical Objective(s)
Students will:
   o Organize and implement a survey.
   o Collect and analyze data from the survey.
   o Analyze descriptive statistics to determine the implications for the real-world situations from which the data derive.
   o Design a survey instrument.
   o Given a plan for a survey, identify possible sources of bias, and describe ways to reduce bias.
   o Write a report describing the experiment/survey and the resulting data and analysis.

NCTM Standards List all applicable NCTM standards related to each task/activity.
   • for measurement data, be able to display the distribution, describe its shape, and select and calculate summary statistics
   • understand the differences among various kinds of studies and which types of inferences can legitimately be drawn from each
   • organize and consolidate their mathematical thinking through communication
   • communicate their mathematical thinking coherently and clearly to peers, teachers, and others
Additional Objectives for Student Learning (include if relevant; may not be math-related):

Economics and Personal Finance
STANDARD EPF.2h
The student will demonstrate knowledge of the role of producers and consumers in a market economy by
h) Describing the effects of competition on producers, sellers, and consumers.

Materials/Resources
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- Rulers
- Computer and software: Microsoft Word, Microsoft Excel
- Copies of the student recording sheet for the second activity

Assumption of Prior Knowledge
Students should be familiar with:
- Using a graphing calculator (for basic operations)
- Calculating the mean (average), median, mode, and range of a set of data.

What relevant contexts (example: analysis & impact of natural disasters; traffic control; social issues) are drawn on in relation to this concept?
- These tasks relate to ideas needed to become more informed consumers.

Introduction: Setting Up the Mathematical Task
Introduction to Activity #1:
Teachers should explain the following background information to the students. The introduction can be done as a whole group discussion activity.

- Question: In the world of economics what is the definition of a consumer?
- In our economic environment do consumers have choices?
- What are some of the choices that the everyday consumer may have?
- Make a list of reasons why someone may want to buy a particular brand of product (over another brand of the same type of product).
- In our tasks for the next couple of days we are going to investigate the following topics:
Why do consumers make the choices that they do in making their purchases?
How could someone become a “smarter” consumer?

Teachers should use guided questions to help students get on the right track.

**Instructional Techniques:** Students will complete the tasks in groups of 2 or 3.

**Student Exploration:**

**Individual Work (if relevant):**
Each individual student will be responsible for contributing to the necessary calculations and recording keeping needed to complete each task assigned.

**Small Group Work (if relevant):**
Each task assigned will be completed in groups of 2 or 3 students. Groups are expected to work together on all necessary calculations and construction needed to complete the task assigned.

**Whole Class Sharing/Discussion (if relevant):** Students will share their results with the class after completing the tasks. This would be a good time for the teacher to use any discrepancies in different group results to open mathematical discussions about the tasks performed in the activity.

**Activity 1: Consumer Opinion Polls**

**Student/Teacher Actions:**

**Task #1: Consumer Surveys**

- Students will need to:
  - Design and conduct a survey based upon consumer opinions.
  - Collect data from the survey.
  - Organize and interpret results from the survey.
  - Communicate their conclusions from the survey through written and graphical representations.

- The teacher should be monitoring the groups to look for group collaboration and communication.
State the following to the class:
Your group will be doing an experiment to investigate the buying habits of consumers. With your group create a list of several reasons for why consumers choose certain brands of products over other brands of products. Create a survey that will provide quantitative data and will also possibly have a normal distribution. Then, analyze your data and write a conclusion about your findings. Make sure to include graphs in your conclusion and report your findings in a written report or presentation.

Activity 1: Consumer Opinion Polls

1. Make a list of reasons why someone may buy a particular brand of a product.
2. Use your list (from number 1) to create a survey to find the opinion of our school population. Surveys must have at least 4 answer options and at most 6 answer options for the people being surveyed to answer.
3. Create a numerical value to go along with your
4. Type up your survey in a Microsoft Word document.
5. Print your group’s survey for (your teacher) to make copies.
6. Conduct your survey and accurately record your results.
7. How could you represent the data collected from the survey?
8. Create a presentation or report for the class. Make sure your work is neat and organized. You will be presenting your findings to the class.
**Assessment List**

Students’ tasks will be assessed by using the following rubric. Rubric may be used by teacher and student.

<table>
<thead>
<tr>
<th>Task Assessed: Consumer Surveys</th>
<th>2</th>
<th>1</th>
<th>0</th>
<th>Student</th>
<th>Teacher</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make a list of reasons why someone may buy a particular brand of a product.</td>
<td>List is complete, neatly written, and stays on topic.</td>
<td>List is somewhat complete, neatly written, and stays on topic.</td>
<td>Task not completed: left blank</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Create a survey to find the opinion of our school population</td>
<td>Survey is complete, neatly written, and stays on topic.</td>
<td>Survey is somewhat complete, neatly written, and stays on topic.</td>
<td>Task not completed: left blank</td>
<td></td>
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</tr>
<tr>
<td>Type up your survey in a Word document.</td>
<td>Typed survey is complete, neatly written, and stays on topic.</td>
<td>Typed survey is somewhat complete, neatly written, and stays on topic.</td>
<td>Task not completed: left blank</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conduct your survey and accurately record your results.</td>
<td>Conducted survey and results from survey are shown, complete, and accurate</td>
<td>Conducted survey and results from survey are somewhat shown, complete, and accurate</td>
<td>Task not completed: left blank</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First representation of data</td>
<td>Data representation is shown, complete, neat, and accurate</td>
<td>Data representation is somewhat shown, complete, neat, and accurate</td>
<td>Task not completed: left blank</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second representation of data</td>
<td>Data representation is shown, complete, neat, and accurate</td>
<td>Data representation is somewhat shown, complete, neat, and accurate</td>
<td>Task not completed: left blank</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sample population is defined in both representations</td>
<td>Sample population is accurately defined in both representations</td>
<td>Sample population is somewhat accurately defined in both representations</td>
<td>Task not completed: left blank</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explanations of how survey was conducted.</td>
<td>Explanations are clear and written/typed neatly</td>
<td>Explanations are somewhat clear and written/typed neatly</td>
<td>Task not completed: left blank</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>