ALGEBRA/ DATA ANALYSIS

Collecting, Organizing, and Analyzing Data

Project Code: A-c.0

Homework Sampling and Simulation

Design and conduct an investigation to determine the length of time students at a school spend on homework per week. Using the data from that investigation, design and conduct a simulation to estimate the probability that 5 randomly selected students will all spend at least 4 hours on homework per week.

STUDENT PROJECT

_____

Student Name

Sample Draft 2008

Maryland State Department of Education
Achievement Matters Most

Project Task

Design and conduct an investigation to determine the length of time students at a school spend on homework per week. Using the data from that investigation, design and conduct a simulation to estimate the probability that 5 randomly selected students will all spend at least 4 hours on homework per week.

Submit the completed project to your Project Monitor by the agreed upon date.

Directions

1. Read the scenario.
2. Read through the project steps.
3. Review the scoring categories to determine where you can receive credit for your work. Discuss this information with the Project Monitor.
4. With your Project Monitor, determine a timeline for completing the project and enter target dates for completing each of the ***CHECK POINTS*** in the space provided.
5. Be sure to check in with your Project Monitor at the ***CHECK POINTS*** listed in the project.
6. Complete the project steps.
7. Submit the project for scoring by the due date.

Requirements

When submitting your project, you must include:

1. A description of the results or the product of each of the 14 steps of the project.
2. A blank copy of the survey you used.
3. The completed survey from each student that participated in the survey.

Scenario

The amount of time students spend on homework varies among students even within one school. The use of a survey with an appropriate sample of the students of a school can provide data to see how widely the amount of time spent on homework varies among the students of that school.

Project Steps

Sampling Part of the Project

Ask your Project Monitor for a copy of the Homework Survey about length of time spent on homework. Using the Homework Survey, design and conduct an investigation to determine the length of time students at your school spend on homework per week. The investigation should compare data from at least 2 groups of students. The 2 groups should have no students in common. (For example: students from the 9th grade versus 10th grade, OR male students versus female students)

1. Describe the 2 groups that you will use in your investigation and modify the Homework Survey so that the students identify which group they are from.

2. Design the investigation to include a method to select a simple random sample of at least 30 students from each of the groups you choose. Describe this method and justify that it will provide a simple random sample of students.

   CHECK POINT **Date** _____ **Student/Monitor Intials** _____/_____

3. Select the sample of students.

4. Administer the survey to each member of the sample.

   CHECK POINT **Date** _____ **Student/Monitor Intials** _____/_____

5. Display the results in an appropriate data display.

6. Analyze the data for each group of students using measures of central tendency and variability. Use mathematics to explain how you determined the measures of central tendency and variability.

7. Estimate the length of time each group of students spends on homework per week. Use mathematics to justify your estimate.

8. Make a comparison of the time each group spends on homework per week and justify your comparison using measures of central tendency and variability.

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Simulation Part of the Project

Using the data from one of the groups, design and conduct a simulation to estimate the probability that 5 randomly selected members of that group will all spend at least 4 hours on homework per week.

Include in your simulation:

9. The data of the group of students you are using for the simulation. For this group, calculate the probability that you are using in the simulation. Explain how you calculated this probability.

10. A tool that models this probability. Describe how the tool models this probability. Justify that this tool is appropriate for this simulation.

11. A description of one trial of the simulation and a justification of one trial. Describe and justify how you will determine if a trial is a success or a failure.

12. The result of the 10 trials.

13. Analysis of the data from the 10 trials. Use mathematics to justify your analysis of the data.

14. An estimation of the probability that 5 randomly selected members of that group will all spend at least 4 hours on homework per week based on the data from the 10 trials. Use mathematics to justify your estimate.

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PROJECT SCORING CRITERIA

Overview

In order to satisfactorily complete this project, the student must:

- complete ALL of the project steps, and
- demonstrate understanding of nineteen (19) of the twenty-five (25) competencies.

Category 1: Sampling

The student may receive credit for a maximum of twelve (12) competencies in this category.

Step	Progress Check* ☑	Competency The student:
1	☐	Determines the 2 groups of students to be part of the investigation
2a	☐	Designs a simple random sampling technique as part of the investigation
2b	☐	Uses principles of simple random sampling to justify the technique.
4	☐	Selects the sample and gathers the data
5	☐	Displays the data with an appropriate data display
6a		Calculates the mean for each group
6b	☐	Explains how to determine the mean
6c	☐	Determines the median for each group
6d	☐	Explains how to determine the median
6e	☐	Determines the mode for each group
6f	☐	Explains how to determine the mode
6g	☐	Calculates the range and/or interquartile range for each group
7a	☐	Determines which measure of central tendency is the best representation of the data for each group
7b	☐	Justifies the measure of central tendency used to represent the data for each group
8a	☐	Makes an informed decision about the given situation
8b	☐	Uses the measures of central tendency and variability correctly to compare the two groups of students with a justification

** Progress checks do not indicate approval of student work.*

Category 2: Simulation

The student may receive credit for a maximum of seven (7) competencies in this category.

Step	Progress Check* ☑	Competency
9a	☐	Calculates the experimental probability of an event
9b	☐	Explains how to determine the experimental probability
10a	☐	Selects a tool that models the probability including what a success and failure are
10b		Justifies the selected tool
11a	☐	Defines a trial for the simulation including what a success and a failure are
11b	☐	Justifies the trial design
12	☐	Conducts the prescribed number of trials and records the results.
13	☐	Summarizes the results of the trials and forms an appropriate conclusion
14a	☐	Calculates the experimental probability of an event
14b	☐	Justifies the experimental probability

** Progress checks do not indicate approval of student work.*