

Chapter 9 Project

Instead of a test this chapter, you will complete a project in groups of 2 students. This project will have two parts: an experiment and a survey.

This project will count as the **chapter test**.

Please **type** your answers using **complete sentences**. Number your report exactly like the questions on this paper are numbered.

On the “test day,” you will present your project to other student groups or possibly from the front of the classroom.

Part 1: Experiment (20 pts)

1. (1 pt) State a question that you can design a good randomized comparative experiment on. Remember that you must have two things to compare: the treatment and the control. This question must be only answerable by doing an experiment, not a survey. *You will do the experiment.* **Have the teacher approve the question.** (Your question must be different from everyone else’s and not be controversial.)
2. (5 pts) Describe in detail
 - a. What is the population? Be very specific.
 - b. How will you choose a sample and put them in groups? (Use a sample size of 10-20.)
 - c. What is the treatment?
 - d. What is the control?
 - e. What results do you expect?
3. (2 pts) Describe exactly what you will do to conduct the experiment.
4. (2 pts) Describe 2 possible sources of error that may be introduced.
5. (1 pt) What specifically will you record? (What numbers are you writing down?)
6. (2 pts) Create a table listing the results of the control and treatment groups.
7. (1 pt) Find the difference of the treatment mean and control mean. (Show your work.)
8. (3 pts) Describe in detail the method the book gives to determine if the results are statistically significant.
9. (2 pts) Use the method from #7 to determine if your results are statistically significant. Include the histogram and show where your result is located on it.
10. (1 pts) What is your conclusion about the experiment question?

Part 2: Survey (20 pts)

11. (1 pts) Create a survey question. The answers must be numerical. **Have the teacher approve the question.** (Your question must be different from everyone else’s and not be controversial.)
12. (1 pt) Identify the population.
13. (2 pt) What type of sampling will you use and describe how you will get this sample?
14. (1 pt) Write a conjecture about what you think the result will be. This must be done before collecting data (surveying).
15. (2 pts) Ask 50 students the survey question and record their answers. Try to get an unbiased sample by equally representing all groups of people (i.e. grade level, gender, etc.). List the numbers here.
16. (1 pt) Organize the data into a table with the data in numeric order. I suggest a table with two columns (values and frequency)
17. (4 pts) Calculate the measures of central tendency (mean, median, mode) and explain which is the best representation of the data. (Show your work)
18. (2 pts) Calculate the measures of dispersion (range and standard deviation).
19. (1 pt) Identify any outliers (any point that is more than 3 standard deviations from the mean), if they exist. (Show your work)
20. (2 pts) Calculate the margin of error and give the interval of 95% confidence. (Don’t use $\pm \frac{1}{\sqrt{n}}$ because that is for yes/no or select-from-options type surveys. Your book gives another way to find margin of error using standard deviation.) (Show your work)
21. (2 pts) Draw a histogram that uses appropriate intervals.
22. (1 pts) Is the data normally distributed or skewed? Explain.

Points

Report: 40 pts

Presentation: 5 pts

Total: 45 pts**Sample Experiment Questions**

1. Does a lid on a cup of hot water cause it to stay warm longer?
2. Does a heavier toy car accelerate down a ramp faster?
3. Does a bigger battery (C vs. AAA) cause a light bulb to be brighter?
4. Does a toy car accelerate down a ramp faster when it is covered in a layer of oil?
5. Does a dice that is not a regular polyhedron favor the biggest side?
6. Does saltwater increase the time it takes an ice cube to melt versus fresh water?
7. Does oil in a pan cause an egg to cook faster?
8. Does putting a piece of clay on one side of a coin make it land on that side?
9. Does putting tape on one side of a dice cause it to roll that side down?
10. Does putting butter on one side of toast make it land on that side?
11. Does a cloth surrounding an ice cube make it melt faster?
12. Does a Nerf dart with a penny stuck to the end travel farther?

Sample Survey Questions

1. How many times have you cheated on a test or quiz in high school?
2. How many times do you text message per school day (while in school)?
3. How many hours of sleep do you get on an average school night?
4. How many hours a week do you play video or computer games?
5. How many hours a week do you watch TV?
6. How many hours a week do you spend on school work?
7. Memory Test (Show 15 objects – 45 seconds to list as many as they can)
8. How many times per week do you eat fast food?
9. Memory Test (Read 15 words – 45 seconds to list as many as they can)
10. How many hours per week do you spend on social media?
11. How many discipline referrals have you had in high school?
12. Perfect Squares Test—Total they know from 1^2 to 15^2
13. How many times have you been grounded by your parents in the past year?
14. How many states have you been to?
15. How many countries have you been to?
16. Height (in inches)
17. Number of Siblings
18. Number of Pets
19. Number of social media followers
20. Number of hours playing sports or being physically active per week
21. Number of fast food meals you eat in a week
22. Number of hats you own
23. Number of pairs of shoes you own
24. Number of hours spent with friends per week
25. Number of books read in a year
26. Number of pictures on your phone
27. Number of bottles of water you drink per day
28. Number of minutes per day you spend on your cellphone (talking, texting, apps, Internet, etc.)
29. Number of minutes spent in personal or family prayer/devotions per day.