***Honors Statistics***

**Final Project**

The final requirement for this course is the completion of a project that demonstrates your understanding of the major concepts of Statistics. Your project must start with an interesting and meaningful question; use a good design for data collection; summarize the data visually, numerically, and verbally; use the data to make appropriate inferences; and reach sound conclusions about the original question. You’ve learned a lot this year. Now it’s time to show off! You may work individually or in pairs. See me for ides, advice, and assistance.

***Directions***

1. Choose a good question to investigate.
2. Design an appropriate study or experiment. (no bias - randomized)
3. Collect good data; they may come from a survey, observational study, experiment, or other sources such as publications or the internet.
4. Summarize your data using appropriate graphical displays (bar graphs, histograms, line graphs, pie charts, etc.), summary statistics, and verbal descriptions.
5. Make inferences based on your data. (confidence intervals and hypothesis tests)
6. State your conclusions.
7. Present your research to the class. (3-5 minute presentation)
8. Submit a complete written report including all of the above.

***Schedule***

**Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** select a topic, get approval (submit question and detailed explanation of data collection procedure), and sign up to present the results.

**Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** work on project in class – be sure to leave enough time to prepare your presentation. (copy handouts, prepare posters, make PowerPoints, etc.)

**Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** class presentations.

**Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** written reports due. (include two blank peer review worksheets and one blank rubric.

***Evaluation***

Grades will be based upon your research question(s), your design, the proper application of statistical concepts and methods, your class presentation, and your written report. (see attached rubric)

**PROJECT ADVICE…**

Every stage of your project is important, and decisions you make at the start can have a major impact on the overall success. Don’t rush into anything; think it all through carefully.

***Goals***

* Think of an interesting question or an issue we care about. (It may help to think beyond the narrow world of our school.)
* Create a good design, free of bias, randomized, that will produce useful data. Remember that controlling an experiment is often easier than sampling.
* Give yourself adequate time to collect and analyze the data. The due dates arrive faster than you think they will!
* Make clear summaries – graphical, numerical, and verbal.
* Produce sophisticated statistical analysis. **You must have a confidence interval, a hypothesis test, and regression analysis.**
* Reach statistically justifiable conclusions about your original question(s).
* Use proper statistical terminology and methods throughout.
* Make a clear, thorough, and interesting presentation to the class. Your presentation should be a visual representation of all the elements in your written report.
* Submit a complete report. Remember, correctly using statistics is more important than arriving at an earth-shaking result. Your written report should be a more detailed representation of all the elements in your presentation.

***Some ideas…***(Feel free to propose something of your own. Be sure to get advice *and approval* before starting.)

* Do after school jobs or participation in sports affect grades?
* Does marijuana or alcohol use differ by grade level, gender, etc.?
* Can we predict height or weight from shoe size?
* Are smokers less likely to wear seatbelts?
* Which grocery store or drugstore has the lowest prices?
* Do males get higher SAT or ACT scores than females?
* Are females equally likely to enroll in advanced math, science, or computer courses?
* Do ninth graders study more or less than juniors or seniors?
* How much stronger is a person’s dominant hand?
* Are lefties more coordinated with their right hands than righties with their lefts?
* Do people prefer Coke or Pepsi?
* Can people tell the difference between national brands and store brands?
* Can people tell by taste whether soda comes form a plastic bottle, a glass bottle, or a can?
* Does mail arrive faster with zip codes?
* Does ESP or astrology actually work?
* Are reaction times faster for males or females? Athletes/non-athletes? Right/left-handed?
* Are homeruns, RBI, or batting averages good predictors of baseball salaries?
* Are NFL or NHL teams more likely to be able to come from behind in home games?
* What is the trend in swimming records? In college costs? In birth rates?

**Peer Review Worksheet**

**Project Completed By: Evaluator’s Name:**

Did the student(s) satisfactorily complete each of the following? Check yes or no.

|  |  |  |
| --- | --- | --- |
|  | **Yes** | **No** |
| **The Question(s)** | | |
| Clearly Stated |  |  |
| Interesting |  |  |
| **Collecting the Data** | | |
| Appropriate Design (randomized) |  |  |
| Clearly Explained |  |  |
| Well Executed |  |  |
| **Data Description** | | |
| Appropriate Tables |  |  |
| Appropriate Graphs |  |  |
| Effective Displays |  |  |
| Appropriate Summary Stats |  |  |
| Clear Verbal Descriptions |  |  |
| **Inference** | | |
| **Confidence Interval** | | |
| Proper Procedure |  |  |
| Clearly Explained |  |  |
| Assumptions & Conditions |  |  |
| Formula, #’s, Answer |  |  |
| Correct Interpretations (in context) |  |  |
| **Hypothesis Test** | | |
| Proper Procedure |  |  |
| Clearly Explained |  |  |
| Correct Hypotheses |  |  |
| Assumptions & Conditions |  |  |
| Formula, #’s, Answer |  |  |
| Correct Interpretations (in context) |  |  |
| **Overall Conclusions** | | |
| Clear and In Context |  |  |
| Fully Supported by the Research |  |  |
| Raises Questions for Further Research? |  |  |
| **General** | | |
| Uses Proper Vocabulary |  |  |
| Thorough and Clear Written Report |  |  |
| Shows Sound Understanding of Statistics |  |  |

**Grader’s Recommendation:**

Are there any revisions to be made to make this project better? How can the student improve their project?

**Final Project Rubric**

Name(s): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |
| --- | --- |
| **The Question(s)**  Clearly stated – interesting. | \_\_\_\_\_\_\_\_\_\_ / 2 |
| **Collecting the Data**  Appropriate design – clearly explained – well executed. | \_\_\_\_\_\_\_\_\_\_ / 3 |
| **Data Description**  Appropriate graphs or tables – effective displays – appropriate summary stats – clear verbal descriptions. | \_\_\_\_\_\_\_\_\_\_ / 6 |
| **Confidence Interval**  Proper procedures – clearly explained – assumptions and conditions – mechanics – correct interpretations (in context). | \_\_\_\_\_\_\_\_\_\_ / 15 |
| **Hypothesis Test**  Proper procedures – clearly explained – correct hypotheses – assumptions and conditions – mechanics – correct interpretations (in context). | \_\_\_\_\_\_\_\_\_\_ / 15 |
| **Overall Conclusions**  Clear and in context – fully supported by the research – raises questions for further research. | \_\_\_\_\_\_\_\_\_\_ / 4 |
| **General**  Uses proper vocabulary – thorough and clear written report – shows sound understanding of statistics. | \_\_\_\_\_\_\_\_\_\_ / 3 |
| **Presentation**  Uses proper vocabulary – thorough and clear class presentation – shows sound understanding of statistics – verbal skills – non-verbal skills – content. | \_\_\_\_\_\_\_\_\_\_ / 32 |
| **Total** | \_\_\_\_\_\_\_\_\_\_ / 80 |

