Statistics (Q1)

"A judicious man uses statistics, not to get knowledge, but to save himself from having ignorance foisted upon him." -*Thomas Carlyle*

Essential Understanding

Statistics is perhaps the most applicable aspect of Mathematics, giving numbers power in defining our daily lives. We can find trends in the weather, our favorite sports teams, job searching… the list goes on and on. When we collect data describing our favorite pastimes or obligations, we can both observe the past and give insight to the future.

Overview:

This quarter, we will be addressing some important trends in our society and acquiring the tools to make meaningful arguments to support our inferences. We will first discuss different types of studies and their applications/historical significance. We will then begin filling our "toolbox" with the necessary techniques so that we can successfully discuss future studies.

General Guidelines:

Lessons will be given in class. You will have multiple mini lessons throughout the week. If you are struggling with a concept, it is your responsibility to review the lessons and ask questions. I will answer any questions you have during the lesson but after that we will follow the "three before me" principle. You must ask three of your peers before you ask me for help

Individual/Group Work – 40% of your grade is based on completing the assignments leading up to the bi-weekly assessment. **All assignments listed are given the same weight.** Use the work period to ask for help from your peers and teacher. **You will submit your notebooks at the end of every other week (Friday), bookmarked at the most current individual work assignment. You must show work to receive full credit.** You may turn in your notebook ahead of time if you finish the assignments early.

Quizzes/Assessments – Quizzes/Assessments make up 30% of your grade and you must complete each quiz/assessment on the date it is scheduled. **Remember: you can always use your notebook on quizzes and exams.** You must make at least 70% to "pass" the quiz/assessment. If you do not pass a quiz, you may retest using a similar exam during my tutoring hours. You may also correct quizzes for half the remaining credit. If you choose to correct, you must attempt corrections for every missed problem.

Final Assessment – The final will make up 30% of your grade. You will not be able to make up the final exam. That is why it is important that you record the notes from the lessons and you do the suggested homework assignments. Practice the concepts to master them. **Your final project is also a part of your final assessment grade.**

Late Work – You will only be able to make up work where you have an **excused absence**, and will be given extra days equal to the number of classes missed. You will not be able to make up Socratic seminars. If you need an extension, you must fill out a petition form and email both myself and your parents with your reasoning!

Materials:

Math Journal: I encourage use of your math journal during lessons and work time. I advise you to use your math journal to take notes during lessons and to work on assignments. Make sure it is neat and organized. Any and all important information from the lessons should be kept in this journal.

Three Prong Folder/Binder: For organizational purposes, please bring a folder or binder in to file supplementary material and worksheets which may be handed out over the course of this quarter. Quizzes and assessments will be handed out on loose paper, so it is extremely important to hold onto them for review.

Calculators: Calculators will be allowed, though you will be expected to show your process in your individual work and assessments.

Lessons:

Content Themes:

____ Arithmetic/Fractions

____ Controlled Experiments

____ Observational Studies

____ The Histogram

____ The Average/Standard Deviation

____ The Normal Approximation for Data

____ Box and Whisker Plots

Logistical Lessons:

____ Reading a Study Guide

____ Color/Subject Groups

____ Mind Maps (Vocabulary)

____ Formatting/Submitting Problem Sets

____ Google Classroom

Guiding question 1:

What is Mathematics? How do different experimental techniques affect study outcomes?

____ ***1)*** Read the first two pages of the study guide and mark it up. Be sure to highlight/ underline information you find important, as well as any parts which are confusing.

____ ***2) Individual Work*:** Mathematics is one of many skills that we inherently use in our daily lives. Without realizing it, you are intuitively calculating amazing and complex situations at any given moment. Whether it's estimating the strength and direction you throw a basketball to make a three pointer or the ways you move your body to the rhythm of a beat, you are living mathematics. For your first project, **gather two images that represent yourself and briefly explain how they are related to mathematics.**

____ ***3)*** Vocabulary: **control, double-blind test, randomized controlled study, placebo, observational study, confounding** (do one of the below).

a. Write the words, their definitions, and an example for each of the above terms in your notebook.

b. Create a mind-map with connections, a story, or a drawing with captions that shows the connections between the above terms.

c. Create vocabulary cards of the above terms. Be sure to include an example for each.

____ ***4) Reading: Salk Vaccine Trial (pg. 3-6)*** Complete the assigned reading and write a question for discussion.

____ ***5) Research:*** Read one of the following articles posted on Google Classroom, write a summary, and identify the vocabulary terms used in the randomized control study. Was there anything the trial missed? How would you improve the trial? Word count should be around 250.

a. *Should FDA Mandate Lower Nicotine Content in Cigarettes?*

b. *Yoga and Emotion Regulation in High School Students*

c. *The Impact of Short-Term Video Games on Performance Among Children with Developmental Delays*

d. Find a randomized control study within your area of interest.

Due: Friday, September 1st

____ ***6)*** **Problem Sets:** You will find the problems in the textbooks located in the classroom **OR** in the pdf form on Google Classroom. You must complete the whole set for full credit.

____ a. Order of Operations with Fractions

____ b. Observational Studies Exercise Set A (1-11 all)

Note: "2.3: More Examples" provides descriptions of studies referenced in the questions.

____ ***7)*** **Group Activity:** Participate in the "Dice Game" activity with your color group.

____ ***8)*** ***ASSESSMENT:*** Fractions, Controlled Experiments, Observational Studies

(Friday, September 8)

Guiding question 2:

How can we transform real world scenarios into data? How do we represent this data in a way which makes sense?

____ ***9)*** Vocabulary: **histogram, class interval, percentage, density scale, qualitative, quantitative, discrete, continuous, average, root-mean-square, standard deviation** (do one of the below).

a. Write the words, their definitions, and an example for each of the above terms in your notebook.

b. Create a mind-map with connections, a story, or a drawing with captions that shows the connections between the above terms.

c. Create vocabulary cards of the above terms. Be sure to include an example for each.

____ ***10) Problem Sets:*** You will find the problems in the textbooks located in the classroom **OR** in the pdf form on Google Classroom. You must complete the whole set for full credit.

____ a. 3.1: Introduction (p.33 #'s 1 through 8)

____ b. 3.2: Drawing a Histogram (p.38 #'s 1 through 4)

____ c. 3.3: The Density Scale (p.41 #'s 1 through 4)

____ d. 3.4: Variables (p.44 #'s 1 through 2)

____ e. 3.5: Controlling for a Variable (p.46 #'s 1 through 2)

____ f. 4.2: The Average (p.60 #'s 1 through 9)

____ g. 4.3: The Average and the Histogram (p.65 #'s 1 through 6)

____ h. 4.4: The Root-Mean-Square (p.67 #'s 1 through 6)

____ i. 4.5: The Standard Deviation (p.70 #'s 1 through 4)

____ j. 4.6: Computing the Standard Deviation (p.72 #'s 1 through 6)

____ ***11) Mini Group Activity: Two Truths and a Lie*** With your partner, research two real articles which include statistics and/or figures. You will create a fabricated article about any topic of your choosing with a word count of 200. Make sure you bring these to class on the date specified.

Note: If you're having trouble with the writing, mimic the structure of a chosen article.

____ ***12)*** ***ASSESSMENT:*** The Histogram, The Average/Standard Deviation

(Friday, September 22)

Guiding question 3:

How do we extract a deeper meaning from a distribution of data? Now that we know how to visually represent data, what tools will help us in comparing one section to the overall distribution?

____ ***12)*** Vocabulary: **normal curve, standard units, normal approximation, percentile, percentile rank, z-score** (do one of the below).

a. Write the words, their definitions, and an example for each of the above terms in your notebook.

b. Create a mind-map with connections, a story, or a drawing with captions that shows the connections between the above terms.

c. Create vocabulary cards of the above terms. Be sure to include an example for each.

____ ***13) Problem Sets:*** You will find the problems in the textbooks located in the classroom **OR** in the pdf form on Google Classroom. You must complete the whole set for full credit.

____ a. 5.1: The Normal Curve (p.82 #'s 1 through 2)

____ b. 5.2: Finding Areas Under the Normal Curve (p.84 #'s 1 through 5)

____ c. 5.3: The Normal Approximation for Data (p.88 #'s 1 through 3)

____ d. 5.4: Percentiles (p.89 #'s 1 through 5)

____ e. 5.5: Percentiles and the Normal Curve (p.92 #'s 1 through 3)

____ ***14) Group Mini-Project: Sounds of a Normal Distribution*** With your statistics group, complete the "popcorn" mini-project assigned on google classroom. You will be collecting and displaying data on the frequency of pops you hear when you microwave a bag of popcorn.

____ ***15)*** ***ASSESSMENT:*** The Normal Approximation for Data

(Friday October 6th)

____ ***12)*** Vocabulary: **median, quartile, interquartile range, box-and-whisker plot** (do one of the below).

a. Write the words, their definitions, and an example for each of the above terms in your notebook.

b. Create a mind-map with connections, a story, or a drawing with captions that shows the connections between the above terms.

c. Create vocabulary cards of the above terms. Be sure to include an example for each.

____ ***16) Problem Sets:*** These final two sets will be worksheets, of which will be passed out during class.

____ Median, Quartiles

____ Box and Whisker Plots

FINAL ASSESSMENT Week of October 16th:

____ ***17) Final Project:*** History of Math. You will be assigned a mathematician and will be expected to create a presentation on their historical significance with your color group. See the handout and rubric for more details.

____ ***18)*** Fractions, Chapter 1, 2, 3, 4, 5, Median/Quartile/B&W Final Assessment

(Friday, October 20th)