Statistics

Quarter Three

“Statistics show that of those who contract the habit of eating, very few survive.”

-George Bernard Shaw

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 gather numbers describing our favorite pastimes or obligations, making sense of them gives you the power to only make sense of the past, but also predict the future. This quarter, we will continue to address some important trends in our society and acquiring the tools to make meaningful arguments to support our inferences.

Overview

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.

Quizzes will be given in the middle and the end of every chapter to assess what you have completed in the past three to four lessons. I will give you warning well in advance in the case of exceptions. If we have enough time, the day prior to quizzes will be review days, which will be your opportunity to clarify concepts or ask last minute questions.

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!

Calculator: I recommend purchasing a scientific calculator for class period and tests. There will be a number of problem sets throughout the year which may require numerous calculations. Cell phones WILL NOT be permitted to be used as an alternative.

General Guidelines:

Problem Sets – 40% of your grade is based on completing each homework assignment. **Homework Assignments Are Recommended Problems For Learning.** The completion of homework assignments will not impact your grade positively or negatively. It is recommended that you do the assignments or similar math problems in order for you to understand and retain the concepts. Use the work period to ask for help from your peers and teacher.
Quizzes – Quizzes make up 30% of your grade and you must complete each quiz prior or on the date it is scheduled. **Remember: you can always use your notebook on quizzes and exams.** You must make at least 80% to "pass" the quiz. If you do not pass a quiz, you may retest using a similar exam.
Assessments- Exams make up 30% of your grade. If you do not pass an exam, you may retest using a similar exam. You must have passed the quizzes prior to taking the corresponding exam. If you do not take the exam on the scheduled date (which is subject to change of course), it will be marked as missing in Power School.

Final Assessment – The final will make up 40% 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 in order to master them. **Your final project is also a part of your final assessment grade.**

Lessons: Probability and Chance

Big Ideas:

1) Assigning a mathematical foundation to the concept of chance.
2) Calculating outcomes of mutually exclusive events happening in succession.
3) Understanding how to calculate the chance an event will occur a certain number of times.
4) Addressing the non-intuitive nature of the law of averages
5) Approximating probability histograms via normal curves

Vocabulary:

1) Frequency Theory
2) Chance
3) Mutually Exclusive
4) Multiplication Rule
5) Addition Rule
6) The Law of Averages
7) Binomial Formula
8) Probability Histogram

Individual/Group Work:

Guiding Question 1: What is probability? How can successive probabilities be mathematically linked together?

Chapter 13: What are the Chances?

____ 13.1: Introduction

____ p.226 (1-5)

____ 13.2: Conditional Probabilities

____ p.227 (1-4)

____ 13.3: The Multiplication Rule

____ p. 229 (1-7)

____ 13.4: Independence

____ p.232 (1-7)

____ 13.5: The Collins Case

____ p.233, Summarize and reflect on this case in a two paragraph essay.

____ Optional: Chapter 13 Review p.234 (1-12)

CHAPTER 13 ASSESSMENT (February 10th)

Chapter 14: More About Chance

____ 14.1: Listing the Ways

____ p.240 (1-4)

____ 14.2: The Addition Rule

____ p.242 (1-6)

____ 14.3: Two FAQ's

____ p.246 (1-5)

____ 14.4: The Paradox of the Chevalier de Mere

____ p.250 (1-7)

____ 14.5: Are Real Dice Fair?

____ Reflect and discuss in a two paragraph response

____ Optional: Chapter 14 Review (p.252 1-14)

CHAPTER 14 ASSESSMENT (February 24th)

Guiding Question 3: A die is rolled ten times. What is the chance of getting exactly three aces?

Chapter 15: The Binomial Formula

____ 15.1: Introduction

____ p.258 (1-6)

____ 15.2: The Binomial Formula

____ p.261 (1-11)

CHAPTER 15 ASSESSMENT (March 3rd)

Guiding Question 4: Now that we know how to predict the probability of a single event, how do we predict the most like probability of a set of repeated events?

Chapter 16: The Law of Averages

____ 16.1: What does the Law of Averages Say?

____ p.277 (1-8)

____ 16.2: Chance Processes

____ Read and Reflect

____ 16.3: The Sum of Draws

____ p.280 (1-7)

CHAPTER 16 ASSESSMENT (March 16TH)

Guiding Question 5: How can we use our knowledge of the Normal Curve in order to approximate probabilistic outcomes?

Chapter 18: The Normal Approximation for Probability Histograms

____ 18.1: Introduction

____ 18.2: Probability Histograms

____ p.312 (1-6)

____ 18.3: Probability Histograms and the Normal Curve

____ 18.4: The Normal Approximation

____ p.318 (1-6)

____ 18.5: The Scope of the Normal Approximation

____ p.324 (1-9)

FINAL ASSESSMENT (Week of April 3rd):

_____ Chapters 13, 14, 15, 16, and 18 Final

_____ Final Project

Readings

Freedman, David. *Statistics 4th Edition.* W.W. Norton & Company, 2007. Print.

Links

Kahn Academy videos on statistics concepts:

https://www.khanacademy.org/math/probability#table-of-content