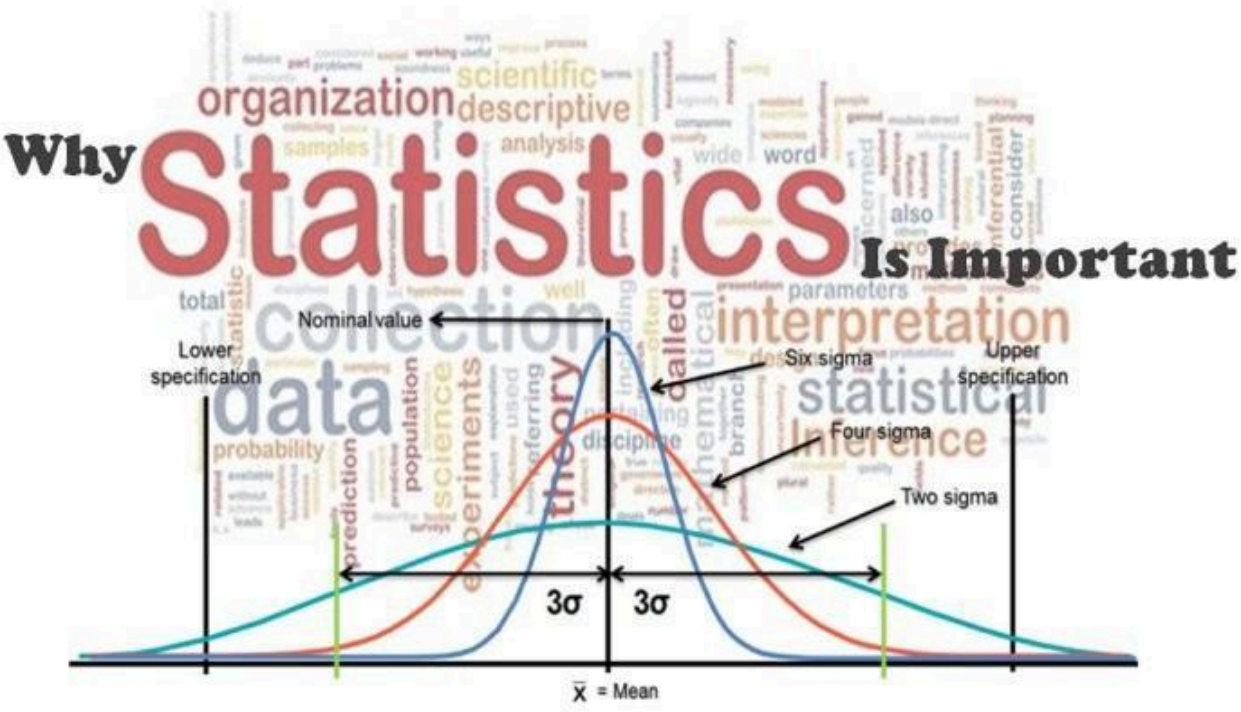
Statistics and Probability



In statistics and probability, we will focus more on probability than in previous years. We will discuss and explore independent and dependent events and calculate probabilities using decimals, fractions and percentages. This unit focuses on extending previous understandings of using appropriate representations for displaying relationships in a set of data; identifying the measures of central tendencies; and solving problems by collecting, organizing and displaying data. This knowledge is then applied to choosing among measures of central tendencies to describe a data set; and making inferences based on analysis of data collected by various means of sampling, in both mathematical and real world situations.

Content Standards:

HSS.ID.A.1 *:Use random sampling to draw inferences about a population*

7.SP.A.1 Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.

7.SP.A.2: Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.

7.SP.B.3 *Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability.*
HSS.ID.C.7: *Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.*

7.SP.B.4 *Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.*

Probability

7.SP.C.5 Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.
7.SP.C.6 Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability.
7.SP.C.7. Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies. If the agreement is not good, explain possible sources of the discrepancy.
7.SP.C.7a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events.
7.SP.C.7b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process.

Unit Transfer Goals

- Apply mathematics to problems that arise in everyday life, society and the workplace.
- Display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication

Unit Essential questions	
Essential Questions: ● How can data be varied? ● Why is it important to carefully evaluate graphs? ● How can you represent the likelihood of an event occurring? ● Why does the average matter? ● Can all events be expressed as a probability?	
Acquisition of Knowledge Skill	
Students will know… 1. Understand theoretical vs experimental probability 2. Data using a variety of graphs such as box-whisker, dot plot, stem and leaf, bar graph, histogram 3. Displaying data using box-and-whisker plots and making appropriate interpretations of those plots 4.Making appropriate inferences about populations based on analysis of sample data and understandings of the bias and randomness of the data samples. 5.The student will understand which measure of center or variation is appropriate to use in different situation	*Students will be skilled at…*I can... 1.Calculate probability as a simplified fraction, decimal, and percent. 2.Use diagrams to organize and show possible outcomes of real-world situations. 3.Understand which measure of center best describes the data. 4.Represent statistical displays in the form of a box-and-whisker plot, scatter plot, and two-way table.

Unit Plan

Week 1: Dates: April 25-29	**What is probability? Can we use numbers to predict events? How can we know all the possible outcomes?**
Learning Target(s):	L1: Introduction to probability: Focus on simple probability L2: Theoretical vs. Experimental Probability L3: Counting Outcomes: Tree Diagrams & Counting Principle
Acquired Knowledge:	-Understanding of probability as a fraction, decimal or percent from 0 to 1 -The difference between theoretical and experimental probability -How to use tree diagrams to outline and showcase possible outcomes to calculate probabilities
Skills, Activities, Due Dates and Assessments:	-100 dice roll activity -Desmos Probability Activity -Check in

Week 2 Dates: May 2nd	**What is an independent event? What is bias? What is a sample?**
Learning Target(s):	L1: Compound probability L2: Relative frequency and probability L3: Using samples to predict data
Acquired Knowledge:	-Understand compound probabilities -Calculate and use relative frequency -Analyze samples to make inference about population
Skills,	-Probability Group Assignment(

Activities, Due Dates and Assessments:	-Gimkit about probability

Week 3 May 9th - 13th	**How can we use graphs to display data? Why should I use different types of graphs for different situations? Can graphs lie to us?**
Learning Target(s):	L1: Statistical Displays introduction(Good graph / bad graph sort) L2: Line Plots and interpretation L3: Quartiles and Box Plot
Acquired Knowledge:	Understanding how to interpret data from graphs -Use line plots to graph data
Skills, Activities, Due Dates and Assessments:	-Escape room about Box plots and graphs -Box Plot desmos activity

Week 4: May 16th - May 20th	**Why do we need different types of graphs? How do we collect meaningful data?**
Learning Target(s):	L1: Scatter Plots & Line of Best Fit L2: Two-Way Tables & Relative Frequency L3: Statistics Project Introduction(Collect Data set)
Acquired Knowledge:	-How to use histograms
Skills, Activities, Due Dates and Assessments:	Problem Solving investigation: Using graphs Weekly Homework Weekly Check in

Week 5: May 23- May 27th	**What makes a graph effective?** **Why is it important to carefully evaluate graphs?**
Learning Target(s):	L1: Selected Appropriate units, tools and displays L2: Review Period L3:Unit Test
Acquired Knowledge:	-Understanding of the power of strong and appropriate graphs -Tools to take a data set and use an appropriate graph
Skills, Activities, Due Dates and Assessments:	Weekly Homework Weekly Check in Unit Test

Assessment Details

Evidence	
I will check students' understanding throughout the unit by...	
Summative Weekly Check ins (5 of them) Mini Group Project Final Statistical Display Project Final Unit Test (May 25th)	**Formative** Daily warm up questions ● Daily bell ringer questions will be used as a way to review and go over previous lessons content. This will act as formative Weekly homework (self grading in class) ● Weekly homework will be assigned and corrected on the first day of each week. They will have one week to complete it.