Unit #2: Probability

Content Area: **Mathematics**
Course(s): **Statistics H**
Time Period: **Semester 1 & 2**
Length: **4 weeks**
Status: **Published**

Standards

MA.S-CP.A.2	Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.
MA.S-CP.A.3	Understand the conditional probability of A given B as $P(A \text{ and } B)/P(B)$, and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.
MA.S-CP.A.4	Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities.
MA.S-CP.A.5	Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.
MA.S-CP.B.6	Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A, and interpret the answer in terms of the model.
MA.S-CP.B.7	Apply the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$, and interpret the answer in terms of the model.
MA.S-CP.B.8	Apply the general Multiplication Rule in a uniform probability model, $P(A \text{ and } B) = [P(A)] \times [P(B\|A)] = [P(B)] \times [P(A\|B)]$, and interpret the answer in terms of the model.
MA.S-CP.B.9	Use permutations and combinations to compute probabilities of compound events and solve problems.
MA.S-MD.A.1	Define a random variable for a quantity of interest by assigning a numerical value to each event in a sample space; graph the corresponding probability distribution using the same graphical displays as for data distributions.
MA.S-MD.A.2	Calculate the expected value of a random variable; interpret it as the mean of the probability distribution.
MA.S-MD.A.3	Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value.
MA.S-MD.A.4	Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; find the expected value.
MA.S-MD.B.5	Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values.
MA.S-MD.B.6	Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).

Enduring Understandings

1) Understanding how certain probability models are used in specific situations.

2) Recognizing the importance of distinguishing between choosing objects both with and without replacement, and how that affects the type of probability model that is used.

Essential Questions

1) Will students recognize and apply various probability rules?

2) Will students be able to differentiate and answer questions involving various probability distributions?

3) How can DESMOS assist in calculating various probability distribution questions, such as uniform, binomial and normal distributions?

Knowledge and Skills

1) Students will be able to apply various probability models to answer questions about the likelihood of events happening.

2) Students with become fluent utilizing the various probability distributions in DESMOS.

Transfer Goals

1) There is no such thing as true randomness.

2) There are differences between calculating theoretical and experimental probabiliities.

Resources

Elementary Statistics 10th Edition

https://doralacademyprep.enschool.org/ourpages/auto/2015/8/18/48840047/Elementary%20Statistics%2010e.pdf