

Unit 4 – Probability, Random Variables, and Probability Distributions

~18 – 20 Class Periods
10 – 20% Exam Weight

Day	Lesson and Objectives	Assignment
1	Activity: Intro to Probability	
2	Notes 1 – Basic Probability and Simulations	HW 1
3	Notes 2 – The Addition Rule	HW 2
4	Notes 3 – Venn Diagrams, Unions, and Intersections	HW 3
5	Notes 4 – The Multiplication Rule and Conditional Probability	HW 4
6	Unit 4 Circuit Review <ul style="list-style-type: none"> Students work together to complete the circuit in class 	None
7	Probability Quiz Review <ul style="list-style-type: none"> Go through the slides to review Notes 1 – 4 The rest of the class period is spent working on “Review Before Probability Quiz Homework” 	Review Before Probability Quiz Homework
8	Probability Quiz	None
9	Notes 5 – Discrete and Continuous Random Variables	HW 5
10	Notes 6 – Combining Random Variables	HW 6
11	Activity: Introduction to the Binomial	None
12	Notes 7 – The Binomial Distribution	HW 7
13	Notes 8 – The Geometric Distribution	HW 8
14	Activity: The Binomial Distribution of Blue	None

15	Random Variables Quiz Review <ul style="list-style-type: none"> Go through the slides to review Notes 3, 4, and 5 The rest of the class period is spent working on “Review Before RV Quiz Homework” 	Review Before RV Quiz Homework
16	Random Variables Quiz	None
17	Unit 4 Test Review <ul style="list-style-type: none"> Provide class time to start working on the review and ask questions 	Turn in the day of the test
18	Unit 4 Project <ul style="list-style-type: none"> Explain the game in class and give students a chance to start working on that 	Work on the project
19	Unit 4 Test	Work on the project

Prerequisite Knowledge	Extensions
<p>The unit assumes that students have had no formal introduction or work with probability.</p> <p>Note: The normal probability distribution has been moved to Unit 5: Sampling Distributions.</p>	<p>Permutations and Combinations Lesson</p> <p>Have students research and report on the following additional probability distributions:</p> <ul style="list-style-type: none"> Hypergeometric Poisson Joint

Special Notes

- Each "Day" is approximately 50 minutes
- Blank days usually involve me finishing up the notes from the day before and then giving them time to start the assignment for that day.
- My pacing is usually under the recommended days from the College Board to allow for me to insert extra days in the unit where I need them (more time on notes; another day to go over homework; extra activities, etc.)
- In my class, I have the HW due the next day in class, the Test Review due the day of the test, and the Unit project due a week from when it was assigned.
- If you have any questions on content or pedagogy, please email me at goldiesmathemporium@gmail.com

Student-friendly learning targets:

- 4A: Students will be able to estimate probabilities using simulation
- 4B: Students will calculate and interpret probabilities for events and their complements (including mutually exclusive events)
- 4C: Students will calculate and interpret conditional probabilities.
- 4D: Students will calculate probabilities for independent events and for the union of two events.
- 4E: Students will represent and interpret the probability distribution for a discrete random variable.
- 4F: Students will calculate and interpret the mean and standard deviation for a discrete random variable.

- 4G: Students will calculate parameters for linear combinations of random variables and describe the effects of linear transformations of parameters.
- 4H: Students will calculate and interpret probabilities, and calculate and interpret the mean and standard deviation for a binomial distribution.
- 4I: Students will calculate and interpret probabilities, and calculate and interpret the mean and standard deviation for a geometric distribution.

Extra Activities

Simulations Activity

- ✓ This activity allows students to practice the four-step process while performing 3 simulations. This use to be my Unit 4 project before “Make Your Own Casino”. If students need extra help with setting up the four-step process to perform a simulation, this is a great activity to walk through.

Simulations and the Binomial

- ✓ Students explore conducting a simulation to answer a question and are met with the limitations of conducting simulations. The solution? The Binomial Random Variable! I did this activity in about half a class period, before we did Notes 5.

Permutations and Combinations Lesson

- ✓ This is an additional lesson you can use to teach the counting principle, combinations, and permutations. There is a set of notes and a homework assignment (this material is NOT covered on the AP exam).

The Poisson Distribution Lesson

- ✓ This is an additional lesson you can use to teach about the Poisson Distribution. There is a set of notes and a homework assignment (this material is NOT covered on the AP exam).