**Lesson Title:** The Addition Rule of Probability

**Unit Title:** Conditional Probability and the Rules of Probability

**Teacher Candidate:** Diego Mendoza

**Subject, Grade Level, and Date:** High School Statistics and Probability, January 31, 2014

**Placement of Lesson in Sequence**

During the unit on the rules of probability, this lesson should be implemented when student are ready to learn the addition rule of probability. Following the structure of the common core state standards for high school statistics and probability, students should first learn conditional probability before participating in the activities of this lesson.

**Central Focus and Essential Questions**

The central focus of the lesson is for students to use probability models provided by their teacher to understand, reason with and problem solve using the addition rule of probability. The dependency of events will also be a topic of discussion during the lesson as it has an effect on all probability models. Questions such as the following will be essential for students to be able to answer correctly by the conclusion of the lesson: How does the dependency of an event affect the outcomes possible when using the addition rule of probability? For example: If event A and B are the two sets in question, how does the probability of one or the other happening (P(A$∩$B))change if A is dependent on B? If B is dependent on A? If the two events are mutually exclusive?

**Content Standards**

[CCSS.Math.Content.HSS-CP.B.7](http://www.corestandards.org/Math/Content/HSS/CP/B/7) Apply the Addition Rule, P(A or B) = P(A) + P(B) – P(A and B), and interpret the answer in terms of the model.

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| **Learning Outcomes** | **Assessment** |
| Students will learn how to answer questions about probability models using the addition rule of probabilityStudents will use critique of each other’s use of the addition rule of probability and teacher guidance to learn the proper use and understanding of the rule | The teacher should first do an example problem on the board similar to the story problem students will work on. This demonstration by the teacher will enhance understanding and procedural fluency through watching the teacher perform the problem. Then, have students work together in small groups to answer the question. Have groups of 4 students and have each group solve the question using 4 steps (they should know the steps from following the example given by the teacher). The group work improves each student’s reasoning skills by using the given information to formulate a means to solve the problem. Once finished, each group will pick one person to present the group’s work. One group should have the task of presenting the first step they took to solve the problem, another should present the second step, and so on. After each group has presented, the class should know all of the steps necessary to solving a story problem using the addition rule of probability. After all parts of the activity are completed the class will have better problem solving skills due to working through each step of the problem and explaining their work. |

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| **Learning Targets** | **Student Voice** |
| I will be able to use the addition rule of probability to calculate and interpret the probability of Event A or Event B happening in a probability model.  | Discuss each question and associated solution as a class: Students ask questions and discuss why different outcomes are occurring. |

**Prior Content Knowledge and Pre-Assessment**

Students have experience with probability models and identifying probabilities of independent and mutually exclusive events occurring.

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| **Academic Language Demands** |
| **Vocabulary & Symbols** | **Language Functions** | **Precision, Syntax & Discourse** |
| * Identify variables from the probability models (story problems)
* Formulate equations using the variables identified to solve problems
 | * Students will be able to discuss the meaning of the addition rule of probability
 | **Mathematical Precision:****Syntax:** * Identify variables as separate events
* Identify probability of separate events occurring

**Discourse:** Discuss how to write the equation for finding P(A$∪$B) |

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| **Language Target** | **Language Support**  | **Assessment of Language Target** |
| Use the terms AND, OR and PROBABILITY correctly when relating them in a probability model and probability equation | In the introduction activity I will model the use of these words correctly. | Student performance during the class discussing and on the homework will be used to assess their use of the language target.  |

**Lesson Rationale (Connection to previous instruction and Objective Standards)**

Students need to be able to apply their math knowledge to make sense of real world probability models. This activity provides an outlet for students to do so and working in groups gives students the opportunity to see how their peers interpret the models.

**Differentiation, Cultural Responsiveness and/or Accommodation for Individual Differences**

Students who struggle will be supported by their peers because they are working in groups.

**Materials – Instructional and Technological Needs (attach worksheets used)**

**The Addition Rule of Probability**

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Class:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

In a survey of 100 college students, 35 were registered in College Algebra, 52 were registered in Computer Science I, and 18 were registered in both courses. How many students were registered in College Algebra or Computer Science I?

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| **Teaching & Instructional Activities** |
| **Time** | **Teacher Activity** | **Student Activity** | **Purpose** |
| 12:05 | Perform example problem on the board introducing the addition rule | Take notes | Introduce the concepts, procedures and problem solving strategies involved when using the addition rule |
| 12:15 | Put students into groups and have them work together to solve the problem | Actively use the addition rule to solve the problem | Apply their knowledge of the rule to solve the problem |
| 12:30 | Have a student from each group present how they performed one step of the problem | Discuss with each other how they solved the problem | Use student voice to help conceptualize the rule |
| 12:45 | Conclude the lesson by answering any questions and assigning homework from the text book that aligns with the CCSS of the lesson | Work on homework until the end of the period | Conclude the lesson |