Anoka-Hennepin Secondary Curriculum Unit Plan

Department:	Mathematics	Course:	Statistics and Probability	Unit 2 Title:	Probability	Grade Level(s):	10-11
Assessed Trimester:	Trimester A	Pacing:	8-10 Days	Date Created:	1/29/2014	Last Revision Date:	1/29/2014

Course Understandings: *Student will understand that:*

A. Selecting and applying counting procedures to determine the number of outcomes and calculating probabilities can be applied to real-world situations to make informed decisions.

DESIRED RESULTS (Stage 1) - WHAT WE WANT STUDENT TO KNOW AND BE ABLE TO DO?

Established Goals

Minnesota State/Local/Technology Standard(s) addressed (2007):

- **Standard (9.4.3.#):** Calculate probabilities and apply probability concepts to solve real-world and mathematical problems.
  Benchmark:
  9.4.3.1 Select and apply counting procedures, such as the multiplication and addition principles and tree diagrams, to determine the size of a sample space (the number of possible outcomes) and to calculate probabilities.
  9.4.3.3 Understand that the Law of Large Numbers expresses a relationship between the probabilities in a probability model and the experimental probabilities found by performing simulations or experiments involving the model.
  9.4.3.5 Apply probability concepts such as intersections, unions and complements of events, and conditional probability and independence, to calculate probabilities and solve problems.
  9.4.3.6 Describe the concepts of intersections, unions and complements using Venn diagrams. Understand the relationships between these concepts and the words AND, OR, NOT, as used in computerized searches and spreadsheets.
  9.4.3.7 Understand and use simple probability formulas involving intersections, unions and complements of events.
  9.4.3.8 Apply probability concepts to real-world situations to make informed decisions.
  9.4.3.9 Use the relationship between conditional probabilities and relative frequencies in contingency tables.

Transfer

Students will be able to independently use their learning to: (product, high order reasoning)

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Meaning

Unit Understanding(s):	Essential Question(s):
Students will understand that: ● Venn diagrams, tree diagrams, 2-way tables will help organize information to allow us to find the probability of an event. ● in order to calculate probabilities accurately you need to consider whether events are independent and if the outcomes are mutually exclusive. ● formulas are useful in calculating probabilities.	**Students will keep considering:** ● How is probability used in a gaming setting? ● How are probabilities impactful in real life situations (i.e. Insurance, Medical Information)?

Acquisition

Knowledge - Students will:

- Multiplication and addition for probability
- Define combinations, permutations and tree diagrams
- Understand what an experimental probability is
- Understand what a theoretical probability is
- Understand the Law of Large Numbers
- Know what a legitimate probability model is
- Define and understand:
  - Intersections
  - Unions
  - Complements
  - Conditional probability
  - Independence
  - Addition rule of probability
  - Multiplication rule of probability
  - Venn diagrams
  - Understand probability notation
  - Identify complements, unions and intersections in Venn Diagrams
  - Symbols for AND, OR, NOT
  - List/know the formulas involving intersections, unions and complements of events
  - Conditional probability formula
  - How to find marginal distributions
  - Understand relative frequency

Reasoning - Students will:

- Distinguish the difference between the multiplication and addition principles
- Distinguish which principles and counting methods are appropriate to use for various situations
- Analyze how the Law of Large Numbers applies to the relationship between experimental and theoretical probabilities
- Determine which probability concept applies to which problem
- Distinguish between intersection, complements and unions of events in real world applications using the words AND, OR and NOT
- Distinguish between situations where the formulas for intersections, unions and complements should be used
- Justify a decision using probability concepts
- Distinguish which values in a contingency table to use in formula

Skills - Students will:

- Use appropriate methods to calculate probabilities
- Calculate probability
- Use the formulas for intersections, unions and complements of events to solve problems
- Use probability concepts in real world situations
- Use contingency tables to calculate conditional probabilities

Common Misunderstandings

- Students cannot decide which method to use.
- Students choose incorrect operations.
- Students incorrectly calculate conditional probabilities.
- Students do not recognize implausible answers.
- Students do not recognize scientific notation on a calculator.
- Students do not understand independence.
- Students do not realize when the complement rule is most efficient.
- Students cannot draw and read a Venn diagram properly when the circles are overlapping.

Essential new vocabulary

- Complements
- Conditional probability
- Dependent events
- Experimental probability
- Independent events
- Intersection
- Law of Large Numbers
- Mutually exclusive/disjoint
- Odds
- Venn diagrams
- Theoretical probability
- Two-way tables
- Union