#### Anoka-Hennepin Secondary Curriculum Unit Plan

Department:	Mathematics	Course:	AP Statistics	Unit 2 Title:	Sampling & Experimentation	Grade Level(s):	10-12
Assessed Trimester:	Trimester A	Pacing:	5-8 Days	Date Created:	1/29/2014	Last Revision Date:	6/25/2014

Course Understandings: Students will understand that:

A. Constructing and interpreting graphical displays of distributions of univariate data will help with the interpretation of data (dotplot, stemplot, histogram, cumulative frequency plot).

F. The methods of data collection will help them to choose appropriate data collection procedures.

G. Planning and conducting surveys properly helps produce credible data.

H. Planning and conducting experiments properly helps produce credible data.

I. Generalization of results and the types of conclusions which can be drawn from observational studies, experiments and surveys will lead to appropriate inference.

### 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 (9.4.2.#): Explain the uses of data and statistical thinking to draw inferences, make predictions and justify conclusions. Benchmark:

**9.4.2.3** Design simple experiments and explain the impact of sampling methods, bias and the phrasing of guestions asked during data collection.

Standard (9.4.3.#): Calculate probabilities and apply probability concepts to solve real-world and mathematical problems.

Benchmark:

9.4.3.2 Calculate experimental probabilities by performing simulations or experiments involving a probability model and using relative frequencies of outcomes.

AP CollegeBoard

• II. Sampling and Experimentation: Planning and conducting a study (10%–15%)

Data must be collected according to a well-developed plan if valid information on a conjecture is to be obtained. This plan includes clarifying the question and deciding upon a method of data collection and analysis.

- a. Students will understand that the methods of data collection will help them to choose appropriate data collection procedures.
- b. Students will understand that planning and conducting surveys properly helps produce credible data.
- c. Students will understand that planning and conducting experiments properly helps produce credible data.
- d. Students will understand that generalization of results and the types of conclusions which can be drawn from observational studies, experiments, and surveys will lead to appropriate inference (This point should be taught and emphasized in the above three course understandings).

Transfer

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

Design a simple experiment (AP llc)

Meaning			
Unit Understanding(s):	Essential Qu		
<ul> <li>Data must be collected according to a well-developed plan if valid information is to be obtained. If data are to be collected to provide an answer to a question of interest, a careful plan must be developed. Both the type of analysis that is appropriate and the nature of conclusions that can be drawn from that analysis depend in a critical way on how the data was collected. Collecting data in a reasonable way,</li> </ul>	<ul> <li>Which method of data collection is most appropria</li> <li>How and when should simulations be used to mod</li> <li>How can variability be minimized in data collection</li> <li>How can bias be minimized in data collection?</li> </ul>		
through either sampling or experimentation, is an essential step in the data analysis process.	<ul> <li>How can we recognize potential sources of bias w</li> </ul>		

# Acquisition

Knowledge - Students will:	Reasoning - Students will:
<ul> <li>Knowledge - Students will:</li> <li>Understand experimental design principles</li> <li>Understand validity</li> <li>Understand the concept of a misleading graph</li> <li>Sampling, bias, design and experimentation</li> <li>Recognize possible bias in sampling procedures</li> <li>Understand appropriate data collection procedures</li> <li>Understand populations, samples, and random selection</li> <li>Understand sources of bias, sampling methods</li> <li>Simple random sample, stratified, cluster</li> <li>Different experimental designs</li> </ul>	<ul> <li>Reasoning - Students will:</li> <li>Justify why a graph is misleading</li> <li>Explain the validity of data based on experiment</li> <li>Distinguish between experiments and observation</li> <li>Distinguish between experimental units, subjects</li> <li>Predict the impact of the different biases on exp</li> <li>Explain the impact of sampling methods, bias, a</li> <li>Skills - Students will:</li> <li>Identify aspects of misleading graphs</li> <li>Identify misleading statistics</li> <li>Use the principles of design to model random experiments of va</li> <li>Plan and conduct data collection properly to proceed to the state of the principle of the principle</li></ul>

Common Misunderstandings	Essential new vocabulary	
<ul> <li>Students confuse blocking and stratifying</li> <li>Students don't realize how important context is when describing a procedure or explaining how vocabulary applies to a given situation</li> <li>Students don't provide enough detail when describing their collection method (using a random digit table or the design itself)</li> </ul>	<ul> <li>Bias</li> <li>Block design</li> <li>Census</li> <li>Cluster sample</li> <li>Control</li> <li>Convenience sample</li> <li>Double blind experiment</li> <li>Experiment</li> <li>Sample survey</li> <li>Matched pairs</li> <li>Nonresponse</li> <li>Observational study</li> </ul>	<ul> <li>Placebo (Effe</li> <li>Population</li> <li>Randomized</li> <li>Response bia</li> <li>Sample</li> <li>Simple rando</li> <li>Simulation</li> <li>Stratified rand</li> <li>Systematic ration</li> <li>Undercoveration</li> <li>Voluntary response</li> <li>Wording bias</li> </ul>

## uestion(s):

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when collecting data?

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