Anoka-Hennepin Secondary Curriculum Unit Plan

Department:	Mathematics	Course:	AP Statistics	Unit 4 Title:	Statistical Inference	Grade Level(s):	10-12
Assessed Trimester:	Trimester B	Pacing:	25-44 Days* *The number of days varies according to which two trimesters the course is being offered.	Date Created:	1/29/2014	Last Revision Date:	6/25/2014

Course Understandings: *Students will understand that:*

N. Students will understand that estimation from samples can be used to draw conclusions about a population (point estimators and confidence intervals).
O. Students will understand that tests of significance help them to draw conclusions about a population.

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):

AP CollegeBoard

- **IV. Statistical Inference:** Estimating population parameters and testing hypotheses (30%–40%)
  Statistical inference guides the selection of appropriate models.
  a. Students will understand that estimation from samples can be used to draw conclusions about a population (point estimators and confidence intervals).
  b. Students will understand that tests of significance help us to draw conclusions about a population.

Transfer

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

- Statistical inference guides decision making.

Meaning

Unit Understanding(s):

Students will understand that:

- Statistical inference guides the selection of appropriate models. Models and data interact in statistical work: models are used to draw conclusions from data, while the data are allowed to criticize and even falsify the model through inferential and diagnostic methods. Inference from data can be thought of as the process of selecting a reasonable model, including a statement in probability language, of how confident one can be about the selection.

Essential Question(s):

Students will keep considering:

- What is statistical inference and what is its purpose?
- How, and to what extent should decisions be based on chance?
- When are tests of significance and confidence intervals used, and to what extent are they reliable?
- What type of errors can occur in significance tests, and how can one prepare for these potential errors?
- How do we determine which test of significance should be used in a given situation?
- What is the difference between t-procedures and z-procedures?
- What is the difference between the various chi-square tests?

Acquisition

Knowledge - Students will:

- Population parameter
- Margin of error
- Properties of point estimators, including unbiasedness and variability

Skills - Students will:

- Estimate population parameters and margins of error
- Calculate confidence intervals for proportions
- Calculate confidence intervals for two proportions

● Meaning and properties of confidence levels and intervals **Reasoning - Students will:** ● Evaluate logic of confidence intervals ● Evaluate logic of significance tests for proportion, two proportions, and for a mean. ● Evaluate for type 1 and type 2 errors	● Calculate confidence interval for mean ● Calculate confidence interval for difference between two means ● Calculate confidence interval for slope of a least squares regression line ● Testing for difference between two means ● Chi-Square test for goodness of fit, homogeneity of proportions, and independence (one and two way) ● Test for slope of a least squares regression line

Common Misunderstandings	**Essential new vocabulary**
● Students misunderstand that the Central Limit Theorem applies to proportions. ● Students confuse paired t tests and 2 sample t tests. ● Students confuse Type 1 and Type 2 error ● Students confuse standard error and standard deviation ● Students fail to provide enough detail when checking conditions for their chosen procedure ● Students confuse when to reject and when to fail to reject Ho ● Students will say “accept” when they need to say “fail to reject” ● Students misinterpret p-values and confidence levels ● Students confuse interpreting a confidence interval with interpreting a confidence level	● Alternative hypothesis ● Central limit theorem ● Confidence level ● Degrees of freedom ● Margin of error ● Null hypothesis ● Population parameter ● Power of a test ● Robust ● Sampling distribution ● Standard error ● Statistical inference ● Statistically significant ● T-statistic ● Variability of a statistic