

# The Ab Lab

*Our state standards emphasize student learning in experimental design and methodology. Throughout the trimester, students are taught the components of experimental design and practice using traditional labs. The Ad Lab is used as a final performance based assessment. Students are given the slogan and come up with the rest entirely on their own.*

## Curriculum/State Standard

Washington State Essential Academic Learning Requirements: study and analyze questions and related concepts that guide scientific investigations; design, conduct, and evaluate systematic and complex scientific investigations, using appropriate technology, multiple measures, and safe approaches; research, interpret, and defend scientific investigations, conclusions, or arguments; use data, logic, and analytical thinking as investigative tools; express ideas through oral, written, and mathematical expression

## Overview

Given an advertising slogan whose validity can be tested in a quantitative fashion, students research and design an experiment to test the advertisers claim. This process is preceded by instruction in methodology and practice in experimental design and modes of scientific communication. The lab concludes with a formal laboratory report and symposium style presentation.

## Objectives

- The student will demonstrate competency in the area of experimental design by developing, conducting, and evaluating an experiment of their own design.
- The student will formulate scientific explanations for their experimental findings.
- The student will demonstrate skills in technical writing and scientific communication by writing a formal laboratory report and presenting findings of their experiment.

## Materials

Name brand and other leading brand foods, display boards, various hardware (as requested by students and based upon availability on campus); for example, microwave, hot plates, bowls, beakers, measuring cups, utensils, toaster..

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# 9-12

GRADE LEVEL



ARTS



LANGUAGE



MATH

Misc

MISCELLANEOUS



SCIENCE



HISTORY



SOCIAL STUDIES

# 3

WEEKS

# \$600

TOTAL BUDGET



THIS WINNING LESSON PLAN WAS SUBMITTED BY:

Elena Stowell  
Kentwood High School  
25800 164th Avenue SE, Covington, WA 98042

## *“The Ab Lab” project continued...*

### **Readiness Activity**

The course begins with an introduction to methodology and experimental design. Students practice by reformatting previously described labs and by reading abstracts and articles of experiments (in Science News, Consumer Reports) and identifying the experimental components (independent variable, dependent variables, constants control, trials). All laboratory activities are broken down for component identification throughout the trimester. Students are also taught technical report writing. All labs written up prior to the Ad Lab may be corrected for scientific technical style. Rubrics addressing specific writing techniques are provided.

### **Strategies/Activities**

Collect advertising slogans that can be tested quantitatively (no taste tests) for validity. I have modified some to fit and written some of my own. The course begins an infusion of methodology and technical writing as well as the required content. We teach in 90-minute periods so it is easy to switch gears. My students use a manual I have written that makes this process easier. Lessons take content commonly taught at the beginning of a biology course (for example, intro to chemistry) so that little content is cut to teach methodology and writing. Students first learn the applicable terminology of experimental design - hypothesis, variable, control, constant - and then practice identifying these components in simple experiments and writings of a “friendly nature” (newspaper reports, abstracts, magazine reports, etc.). Students continue with practice in procedure and flowchart design, data table construction, graphing, and formal formatting. All lab activities throughout the course are then subjected to component identification,

and each requires a new piece of technical writing - adding the new piece to the one learned prior - until all sections of a formal lab report are learned. For example, students first learn to write formal titles. This will be the only writing graded in the first lab. The remainder of the grade is content based. Next, students learn to write formal introduction (rationale, purpose, prediction). In the second lab collected, the title and the introduction will be graded, and so on. Teachers can adjust this to accommodate the number of lab reports they require and the length of their classes. In general, students are doing complete lab reports by midway through the term. Students are given an advertising slogan 2 weeks before the Ad Lab is to be performed. For example, “Mrs. Butterworths - so thick she takes her time.” They now have out-of-class time to prepare their experiment. One week before the experiment is to be performed, collect materials lists. Have students divide materials into “consumable” and “hardware” columns. Go shopping for the consumables heeding the student descriptions - by now they should know that just writing down “syrup” is not enough as there are many brands, styles, and sizes. Check off all materials purchased and all hardware the science department can provide.

### **Culminating Activity**

The experiment is performed! Students must have designed their experiment so all data can be gathered in a normal class period. Students who want more data (to increase validity) or want additional control data are encouraged to do the experiment at home as well. After the experiment, students have 2 days to put their Ad Lab in to publishing ready laboratory format, including an abstract. Digital images taken during experimentation or to document the procedure are highly encouraged. Students also prepare a display board of their work. Display boards are presented during a symposium style class. If time allows, student work can be bound into a student style Consumer Reports document.

### **Evaluation**

Student experimental design and technical writing are evaluated using rubrics with which students are familiar and that were presented during the instructional time earlier in the trimester. Students receive peer assessment on their project boards as well as feedback from other faculty on campus (the symposium is open to the entire campus).