



ANALYZING THE “POP” IN POPCORN

LABORATORY EXPERIMENT

ADAPTED FROM THE ACS CHEMSOURCE GAS MODULE

INTRODUCTION

Corn is a common foodstuff, native to the Americas, which appears in many forms: corn on the cob, corn off the cob, creamed corn, and popcorn. Field corn, which is also fed to livestock, is used by some people as decorations during Halloween and Thanksgiving. Popcorn is a favorite snack, especially when watching movies. Each variety of corn contains different amounts of water, sugars, and starches. Popping popcorn involves heating the corn until the pressure inside the kernel is great enough to cause it to burst, turning the kernel inside out and releasing trapped moisture.

PURPOSE

To determine the percent of water in popcorn and use the ideal gas law to determine the pressure inside the kernel when it pops.

SAFETY INFORMATION

In this lab, observe all standard safety precautions, especially the ones listed below.

- Safety goggles and lab aprons must be worn at all times.
- Heat the flask evenly to prevent spattering the oil.
- Heat with care. Oil is flammable.
- Do not eat the popcorn.

PROCEDURES

1. Record the mass of a plastic weighboat.
2. Select and weigh 20 kernels of one type of popcorn.
3. Calculate the mass of the popcorn kernels.
4. Using the water displacement method, find the volume of the 20 kernels using a 10-mL graduated cylinder filled with 5-mL of water. Dry the kernels thoroughly.
5. Add 2 mL of cooking oil and the 20 kernels to an empty, dry 250-mL Erlenmeyer flask.
6. Determine the mass of the flask, oil, and popcorn.
7. Assemble a ringstand with ring, placing wire gauze on top of the ring.
8. Using a utility clamp, fasten the flask to the stand so it sits on the wire gauze. Cover the flask with a piece of aluminum foil. Puncture a small hole in the aluminum foil.
9. Light the burner.
10. Use the burner to **slowly** heat the flask until the popcorn begins to pop. Remove the heat when most of the kernels have popped. Do not burn the popcorn.
11. Remove the aluminum foil from the top of the flask so all the steam vents out.
12. Allow the flask to cool for 10 minutes, and then weigh the flask and contents.
13. Clean up the lab as follows:
 - a. Place the aluminum foil and popcorn in the garbage.
 - b. Wash the flask and graduated cylinder thoroughly with soap and water.
 - c. Do not leave your lab bench or remove your safety clothing until excused by the instructor.

Analyzing The Pop In Popcorn Lab

Jon Klement



Analyzing The Pop In Popcorn Lab:

Design and Analysis of Experiments Angela M. Dean, Daniel Voss, 2006-04-06 Our initial motivation for writing this book was the observation from various students that the subject of design and analysis of experiments can seem like a bunch of miscellaneous topics. We believe that the identification of the objectives of the experiment and the practical considerations governing the design form the heart of the subject matter and serve as the link between the various analytical techniques. We also believe that learning about design and analysis of experiments is best achieved by the planning, running, and analyzing of a simple experiment. With these considerations in mind, we have included throughout the book the details of the planning stage of several experiments that were run in the course of teaching our classes. The experiments were run by students in statistics and the applied sciences and are sufficiently simple that it is possible to discuss the planning of the entire experiment in a few pages and the procedures can be reproduced by readers of the book. In each of these experiments, we had access to the investigators' actual report, including the difficulties they came across and how they decided on the treatment factors, the needed number of observations, and the layout of the design. In the later chapters, we have included details of a number of published experiments. The outlines of many other student and published experiments appear as exercises at the ends of the chapters. Complementing the practical aspects of the design are the statistical aspects of the analysis. We have developed the theory of estimable functions and analysis of variance with some care but at a low mathematical level. Inquiry and Investigation Ellen Ungaro, 2010 A look at the scientific process, how it evolved, and the necessary skills of scientists.

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This core text for K 8 science methods courses helps novice teachers become confident and competent in inquiry centered standards based classrooms Science content and pedagogy are blended using a carefully crafted developmental approach in which teachers begin by learning basic ideas and practicing simple instructional strategies Once these are mastered teachers move on to learn and teach advanced concepts and complex experiments Students learn how to deliver inquiry based instruction create standards based lesson plans link instruction and assessment design performance assessments use a variety of teaching strategies and integrate science across the curriculum

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