Appendix B

Example of an At-Home Experiment from the Physical Science I Course Text

***Additional Homework: An At-Home Experiment***

The goal of this assignment is for you to design and carry out an experiment that answers the following question: **Is evaporation rate affected by how much of a liquid’s surface is exposed to the air?**

Once you have completed your experiment, you will bring your data to class so that we can compare your data with your classmates’ data. We will then use our pool of data to answer the scientific question.

In-Class Discussion.

At-home experiments can be challenging, so we need to clarify some of the trickier details of this activity.

1. Group Discussion:
2. In the scientific question that we are trying to answer, what exactly do we mean by “surface exposed to the air”? What are examples of different liquid samples that have different surface areas exposed to the air?
3. Imagine that a cup and a swimming pool each lose 1 cm of water (in height) due to evaporation. Did the cup and swimming pool lose the same volume of water? Did they lose the same mass of water? Why or why not? *Note*: This explains why measuring the changing height of the liquid (in inches or centimeters, e.g.) is not an appropriate method for determining evaporation rate.
4. Given that measuring liquid height is inappropriate, what are possible ways of measuring evaporation rate?
5. We don’t want to use narrow-necked containers to hold our liquids (e.g., 20-oz soda bottles). Why do you think this is?
6. To structure a valid scientific experiment, it is important to properly control certain experimental variables.
   1. What does it mean to ‘control’ a variable?
   2. What are the different factors that we need to control in this experiment? How should these factors be controlled?
7. Class Discussion: Experimental methods for our first at-home experiment

At-Home Experiment: Report requirements.

This assignment should be done individually. The at-home experiment and report should not be done in a group or with a partner. Your report, which must be typed, must contain the following sections:

1. Your list of materials, including a photograph of your set-up (with you in the picture)
2. Your detailed experimental procedures in a step-by-step format (minimum word count = 100 words). *Note*: The word count must be included (e.g., “114 words”) to receive full credit.
3. Your original prediction, with reasoning (i.e., what your results might be, and why)
4. The calculations for the initial surface area of each liquid sample (must show all work)
5. Your experimental data (presented in a table), including the total amount of water evaporated.

Due date for your report: \_\_\_\_\_\_\_\_\_.

***Follow-Up for the At-Home Experiment***

This section is to be completed after the experiments have been performed and the reports have been written and submitted.

1. Group Discussion:

* What were our experimental methods?
* What results did we find?
* Based on our experimental data, what is the answer to our scientific question?
* In retrospect, is there anything that we could have done to improve our experimental methods?

1. Class Discussion: Our answers to the questions above