**Challenge 4: Technical Writing & Calorimetry**

*ASEN 2012 ~ 27 Sep 2019*

The purpose of this challenge is to practice applying technical writing principles to content relevant for your calorimetry project report.

Two prompts are provided below. You will write an **individual** response to the first prompt. When directed, you will trade with your group member to receive edits. When critiquing each other’s work, use the principles and editing tips provided in lecture. Then, incorporate the suggested edits as appropriate. This process will be repeated throughout the challenge time. If you feel that you have written your final response, move on to the second prompt and repeat the process.

As a reminder, your emphasis should be on implementing the three key principles of technical writing and the four principal problems that were covered in this week’s lecture.

Some resources that may be useful:

* BCcampus provides a useful overview of calorimetry in the first part of [this write-up](https://opentextbc.ca/chemistry/chapter/5-2-calorimetry/). The methodology and application of calorimetry are covered in your ASEN 2002 lab and ASEN 2012 lecture, but feel free to use this and other outside resources if you wish to refresh your knowledge or dig deeper into calorimetry. **Remember that you must cite all external resources.**
* The American Institute of Aeronautics and Astronautics provides a [template for technical writing](https://ae.engr.ku.edu/sites/ae.drupal.ku.edu/files/docs/AIAA%20Papers%20Template.pdf). This template will be used in your Project 1 deliverable.

Note: This challenge will be based an individual submission, so you will not include a group number in your file name. NAME YOUR FILE AS FOLLOWS:

* Section 1: Challenge4\_S1\_{last name}\_{first name}.pdf
* Section 2: Challenge4\_S2\_{last name}\_{first name}.pdf

**Upload a typewritten PDF document to Canvas to complete the challenge.** If you hand-write your response to the prompt during class, you are still expected to submit a typewritten version to Canvas by Tuesday at midnight.

Challenge author: Hugo Stetz

**What is the purpose of calorimetry? Why are calorimetric methods and analyses relevant and useful to us as engineers?**

…

A calorimeter is a thermally isolated device used to perform Calorimetry. Calorimetry is used to determine the specific heat capacity of a material. The specific heat capacity is an important thermal material property for engineers, as it can help engineers to understand the rate of heating and heat transfer of materials. Understanding these rates can help engineers design better devices in situations where heat transfer is important.

**In ASEN 2012 we put significant focus on error and uncertainty analysis. What are some potential sources of error or uncertainty in calorimetric data collection, and how might an experimenter account for them?**

…

Calorimetric data collection has a number of potential sources of uncertainty. This uncertainty is derived primarily from the experimental set up where things like a lack of sufficient thermal isolation can result in loss of thermal energy and affect the measured increases in temperature. These measured increases in temperature are also highly subject to the precision of the temperature sensor and the rates at which these samples are taken. Sampling errors such as these can be mitigated with multiple temperature sensors and higher sampling frequencies while errors incurred due to heat loss can be mitigated with better insulation as well as a greater understanding of the thermal properties of the calorimeter itself and the ambient temperatures.