

Analysis of Trial 1/Modifications for Final Trial

1. Evaluate for Systematic Errors

The first step is to be sure that there are no systematic errors. An undetected error of this type will lead to further errors.

Make a plot of the temperature vs time for both the water and the medicine.

Check

Your notes of the observations of the experiment to verify that all of the salt dissolved.
The rate at which the temperature changed in the outer container
That the temperature difference of the medicine and water was small as expected.
Your calculations of the most significant heat losses

2. Compare actual heat generated with expected (calculated) heat release

Analysis Calculations:

Heat expected from salt dissolution (previously calculated):

Heat actually transferred to water (total volume is salt water + medicine):

Heat unaccounted for (lost to surroundings or inefficiencies)

$$Q_{\text{(lost)}} = Q_{\text{(expected)}} - Q_{\text{(actually transferred)}}$$

$$\text{Calculate the fraction of heat transferred} = Q_{\text{(actually transferred)}} / Q_{\text{(expected)}}$$

Based on your results, observations, and calculations, analyze results, and propose changes on the reverse side.

Modifications of Salt Amounts

If a significant amount of heat was lost to the surroundings, increase the amount of salt.

$$Q_{\text{(trial 2)}} = Q_{\text{(trial 1)}} / (\text{fraction of heat transferred in trial 1})$$

Determination of Salt Amount for Trial 2

Based on your analysis of your data, decide on a reasonable change in the heat required. Calculate the amount of salt needed to generate this quantity of heat.

$$Q_{\text{(trial 2)}} \text{ _____}$$