

Kukui Nut Calorimetry, Place-Based Learning in General Chemistry Lab at the University of Hawaii at Manoa

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INTRODUCTION

- Kukui nuts were used to create a connection between chemical concepts and the students' place
- The new place-based general chemistry lab experiment taught calorimetry concepts and enhanced learning as compared to traditional experiments



CHEMICAL OBJECTIVE: Determine the Heat of a Kukui Nut

- Students ignite the meat of Kukui nut below a beaker of water
- Students calculate the amount of heat produced from the Kukui nut (per gram of Kukui nut burned) based on the change of water temperature: $q_{kukui} = -q_{water} = -(m\Delta T C_s)_{water}$



PEDOGOGICAL OBJECTIVE: Enhance Student Learning using a Place-Based Experiment

- Surveys gauged student interest and learning from those who performed the Kukui Nut experiment vs a traditional Styrofoam cup calorimetry experiment
- Distribution of student responses is shown in the bar graphs where 5 is the most positive and 1 is the least positive

Student Interest

 Students who performed the Kukui nut experiment recorded more positive responses regarding their interest



Student Engagement

 Kukui nut students were more engaged when performing the experiment



Student Understanding

More students correctly identified learning outcomes from the Kukui nut experiment, demonstrating its effectiveness for teaching calorimetry concepts



Student Connection to Kukui Nuts

- Many students first learned of Kukui nuts through this experiment, providing them a connection to their environment
- 93% of students responded that the use of Kukui nuts for the experiment increased their interest



CONCLUSION

- The use of Kukui nuts in this experiment provides a tangible element for students to connect with their place
- The place-based experiment enhanced student interest and engagement and resulted in a better chemical understanding