

Speaker:

Name: Tim Sibbald

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Position: Assistant Professor

Title: Kitchen science explores cone formation.

Intended Audience: High School

Type of Presentation

Preferred: Long Presentation (60 minutes)

Description:

NOTE 1: This would ideally be a 1.5 hour session, but will endeavour to do it in one fast paced hour.

This session is a mathematics investigation using kitchen-science. In particular, the goal is to resolve some questions about the cone shape that is formed when material falls onto a pile. The objective of this session is to make and test hypotheses with the goal of determining key variables that might influence predictability of the outcome. Consider various questions such as: How does the height of pouring influence the conical shape that results? How much difference do you expect between different substances such as sugar, salt and sand? Does density of the material matter? If material pours from a cone, what parameters of that cone influence the conical pile that is formed? (Does the slope of the supply cone influence the slope of the resulting conical pile?)

In essence, this session is about collective exploration with a goal to identify what the variables are using simple equipment and kitchen materials. From the identification of variables, suitable mathematical tools need to be identified and measurements made. No surprise that slope will be a key consideration but data management may be necessary to address the “kitchen” nature of the exploration.

Will it be necessary to consider the volume of the frustrum of a cone? Questions such as this indicate the need to assess the many facets of the task. The scientific elements and observational skills, the restrictions of the kitchen element, and the appropriateness of the mathematical tool box. Ultimately, the goal is not to resolve everything neatly (certainly not in an hour), rather the intention is to demonstrate collective exploration, a STEM activity setup that can be used in the classroom in various ways, and to look for the emergence of mathematics that might inform the curriculum rather than driven by the curriculum. Extensions will doubtlessly arise, but the session will focus on simplicity and organized educational play.