

**Research Experiences for Teachers (RET)**  
**Center for Pre-College Programs**  
**New Jersey Institute of Technology**

**LESSON PLAN**  
**Introduction to Engineering**

**LESSON TOPIC:**

A Taste of Chemical Engineering

**STANDARD(S) & INDICATOR(S):**

5.4.4.C3. Use the design process to identify a problem, look for ideas, and develop and share solutions with others.

**OBJECTIVE(S):** Students will be able to:

Apply their prior knowledge to design a process that will make a dessert using limited materials.

**MATERIALS:**

See activity description

**BACKGROUND INFORMATION:**

Student will apply their knowledge of size and intermolecular forces while designing a process that will meet the required objective using limited materials.

**CLASSROOM ACTIVITY DESCRIPTION (LABORATORY/EXERCISES/PROBLEMS)**  
**including detailed procedures:**

Students will be asked to make custard that requires powdered sugar. They must design a process in which they can achieve this task with granulated sugar and other materials such as a mortar and pestle and other dry coating particles.

1. Students are presented with the project:
  - Scenario: They work as an outside contractor for Sarah Lee
  - Work Objective: Sara Lee wants to put out a new dessert...CUSTARD!
  - Problem: Granulated sugar is cheaper AND they must provide a design to manufacture this custard. Their main concern with the manufacturing process will be the production line in which every ingredient will mixed into the batter.
2. Students will collaborate and explore solutions to alter the properties of sugar.
  - They may grind the sugar using mortar and pestle or by collision. (size)
  - They may also coat the ground sugar with inactive ingredients. (flow)
3. Students will test ideas. (small scale)
4. Students will put together a working model of the production line.
5. Students will make, test and evaluate the product. Use of food's room will be necessary

**PARAMETERS TO EVALUATE STUDENT WORK PRODUCTS:**

Design of process. Ability to accurately record and modify their process. Achieve desired goal.

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Lesson Plan Template

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