| **Week 2** | **Topic: Food Engineering Reflection** |
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| Lesson Topic: | Essential Question: How can we use the engineering cycle to make the best raspado or shave ice? |
| Objective: | Students will be able to:   1. Use the engineering cycle to create the best raspado recipe. |
| Standards Addressed: | **SEEd Science and Engineering Practices**   * **Constructing explanations and designing solutions:** Students construct explanations about the world and design solutions to problems using observations that are consistent with current evidence and scientific principles.   **SEEd Crosscutting Concepts**   * **Cause and Effect:** Students investigate and explain causal relationships in order to make tests and predictions.   **SEEd Disciplinary Core Ideas**   * **(ETS1.A)** Defining and Delimiting an Engineering Problem * **(ETS1.B)** Developing Possible Solutions * **(ETS1.C)** Optimizing the Design Solution   **Engineering and Technology Strands and Standards**   * **Strand 3:** Students will apply the elements of an engineering design process to create a product or system. |
| Vocabulary: | **Engineering Design Process:** A cyclical process that engineers use to solve problems. It begins by defining and identifying a problem, developing possible solutions, and optimizing and comparing solutions.  **Fishbone Analysis:** Using a fishbone diagram to identify the causes of a problem.  **Constraints:** Limitations on the design, such as available funds, resources, or time.  **Raspado:** An ice-based dessert. |
| Time Estimate: | 60-80 minutes |
| Prep: | **Before the lesson:**   * Lay ingredients in a safe location. * Place protective barriers on the floor or desks. * Dedicate a station for sharp objects like knives. * Have all supplies placed around the classroom in an organized fashion. * Have extra trash/compost/recycling bins ready. You might need extra. |
| Materials: | **Be sure to have:**   * Food items for raspados (these can obviously be adapted to whatever is available).   + [Blenders](https://www.amazon.com/s?k=portable+blender&i=garden&crid=2RL30YFC5MXGX&sprefix=portable+blender%2Cgarden%2C554&ref=nb_sb_noss_1)   + [Jello cups](https://www.amazon.com/200-Sets-Plastic-Condiment-Containers/dp/B07TK3NBLQ/ref=sr_1_3?crid=2HPV84KK0PGYX&keywords=jello+shot+cups&qid=1659284837&s=home-garden&sprefix=small+plastic%2Cgarden%2C3111&sr=1-3)   + Mangos   + Mint   + Bananas   + Milk   + Ice cream   + Condensed milk   + Yogurt (dehydrated or otherwise)   + Peaches   + Strawberries   + Lechera   + Pineapple   + Lime   + Lemon   + Ice   + sugar   + Guava   + Chili powder   + Salt   + Chili peppers   + Knives ([oh boy](https://www.amazon.com/Tovla-Knives-3-Piece-Nylon-Baking/dp/B0711QYPJD)) * Raspados Optimization Sheet * Slides on the basics of raspados AND the engineering cycle[Making Raspados Lessons 1 & 2.pptx](https://docs.google.com/presentation/d/1wQhDYqnzVcv-ros0k7OSkOAF-gQG2peE/edit?usp=sharing&ouid=109632780189519879631&rtpof=true&sd=true) |
| Modifications: | Alternatively:   * This lesson can be adapted to solve many problems that students bring up. Obviously, many different types of food can be put in place of raspados. |
| Assessment: | Raspados Sheet |
| Procedures: | **Prep**   1. Pull up slides (or whatever) and tell students that they will be using the engineering cycle in order to create the best raspados. Briefly explain what raspados are (1 minute). 2. Pass out the Raspado Optimization Sheet and tell students that we will use this again to solve a problem. Have them write “delicious raspados” or something in the first cell. Remind students that engineering is using science and technology to solve problems. This time, we will be solving the problem of making the greatest raspado possible. Additionally, remind students that all engineering problems have constraints. The constraints here will be the ingredients and equipment that we have available (2 minutes). 3. Allow students to work in groups and fill out the fishbone (examples can include things like ingredients, texture, sweetness, spice, etc.) (5 minutes). 4. As a class, discuss what students placed as their potential idea for a raspado. Also identify constraints (2 minutes). 5. Pass out raspados sheet. Give students basic rules for the project. Make sure they list all ingredients on the sheet. Tell them that they are only to use the blenders and knives in a professional manner (no fingers in the blender while it’s plugged in, knives must stay at a station, no stabbing, etc.). Tell them to have other students taste with small jello cups. Quickly model the raspado sheet with an example of how to fill it out (5 minutes).   **Raspados**   1. Allow students to make and remake raspados. Priorities for this time is to ensure safety and remind students to optimize their design (40 minutes). 2. Clean up supplies and ensure all sharps are accounted for (5 minutes). |

**Name: Period:**

| **Define: Use the space below to describe your best raspado idea** | **Develop: Use the space below to describe how to make your raspado, step by step.** | **Develop: Use the space below to list what materials you will need to make your raspado. You need to list everything!** | **Optimize: Use the space below to describe how you plan to test and improve your raspado.** |
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**Nombre: Clase:**

| **Define: Utiliza el espacio debajo para describir tu mejor raspado.** | **Desarrolla: Usa el espacio a continuación para describir cómo hacer tu raspado, paso a paso.** | **Desarrolla: Usa el espacio a continuación para enumerar los materiales que necesitarás para hacer tu raspado. ¡Tienes que enumerar todo!** | **Optimizar: usa el espacio a continuación para describir cómo planeas probar y mejorar tu raspado** |
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