Culinary Institute of America

Methods: Creaming, Custards, Sugar Cooking, Binding Agents

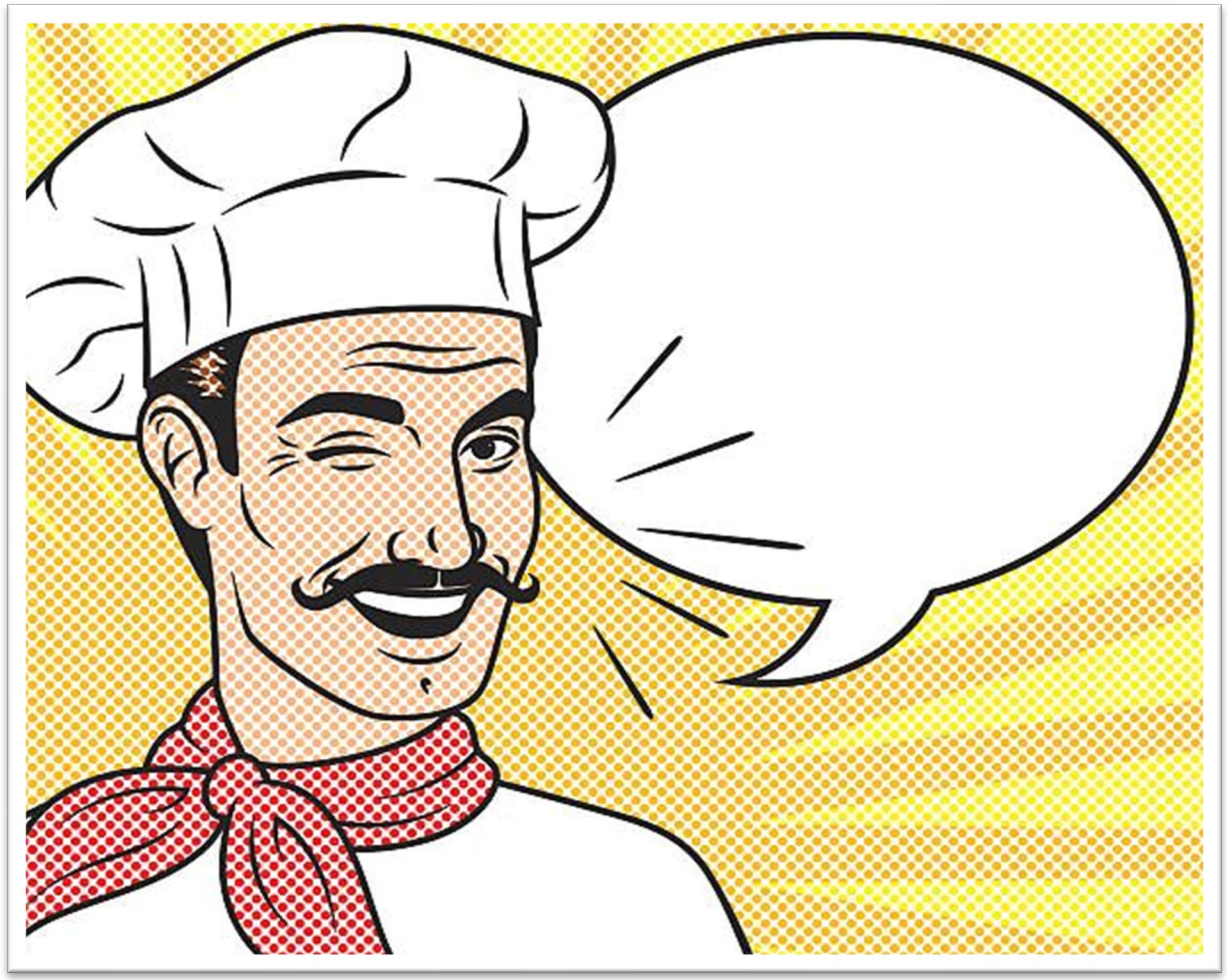
Day 1

Introduction: **Chef Egan**

- I’m an Associate Professor of Baking and Pastry Arts at CIA’s New York campus. I teach Chocolates and Confections, Basic and Classical Cakes, Advanced Baking Principles and Baking and Pastry Techniques.
- I focus on process, repetition, and time management, helping students build confidence through hands-on learning.
- I trained at Drexel University and the CIA and worked in renowned kitchens including L’Atelier de Joël Robuchon, The Modern, and Blue Hill at Stone Barns.
- I am a Certified Master Baker (CMB) and Certified Hospitality Educator (CHE).

Icebreakers

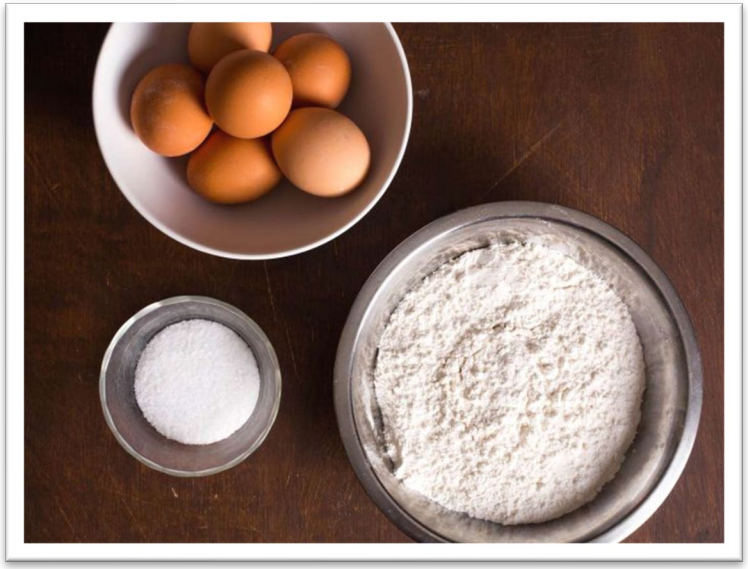
- State your name.
- Where are coming from?
- What type of work you do?
- What is your deserted island food?



Learning Objectives

- Explain the function and role of liquefiers and stabilizers in recipes.
- Analyze the creaming method and its effect on texture and structure.
- Identify and differentiate the three types of custards.
- Describe the common thickening agent used in custards.
- Compare methods for boiled, baked, and stirred custards.
- Explain the role of binding agents in culinary preparations.
- Describe proper sugar cooking techniques, including key do's and don'ts.
- Prepare a range of desserts using standardized recipes with accuracy and consistency.

Liquefiers and Stabilizers



Liquefiers *inhibit* structure

- Examples: water (and other liquids), fat, sugar

Stabilizers *promote* structure

- Examples: flour, eggs, chocolate, binding agents (cornstarch, gelatin, agar agar)

Understanding the difference between the two and categorizing ingredients → understanding pastry (and being able to fix/avoid mistakes)

Creaming Method

- Butter (or other solid fat) is beaten with sugar to create tiny air pockets
- Air pockets expand in the oven giving baked goods a light, airy texture
- **Examples**: cookies, cakes, cupcakes

Creaming Method Steps

1. **Soften the butter:** let it reach room temperature for optimal creaming
2. **Mix butter & sugar:** beat together on medium speed with the paddle attachment until light and fluffy
3. **Scrape the bowl:** stop the mixer and scrape the sides and bottom of the bowl as needed
4. **Add liquid gradually:** slowly add the liquid, mixing for a minute after each addition

Creaming Method Steps

5. **Scrape the bowl again:** scrape the sides and bottom of the bowl after each liquid addition
6. **Add flour:** add all the flour at once and mix on low speed until just incorporated
7. **Final scrape:** scrape the bowl one last time to ensure everything is mixed well

Custards

3 Types of Custards

Baked:
Crème brûlée

Boiled:
Pastry cream

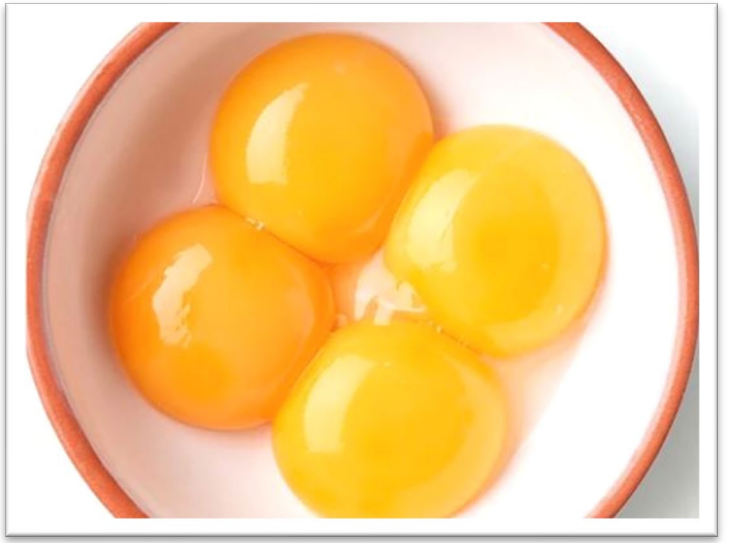
Stirred:
Crème anglaise

Custards: Basic Ratios

	Liquid	Eggs	Sugar	Starch	Temp
Stirred					
Crème anglaise	1 qt. milk	12-16 yolks	8 oz	None	175°F
Sabayon	1 qt. wine	12-16 yolks	8 oz	None	140°F
Boiled					
Pastry Cream	1 qt. milk	6-8 eggs	8 oz	2 oz	2nd boil
Baked					
Crème brûlée	1 qt. milk	12-16 yolks	8 oz	None	325°F, Water bath
Cheesecake	2 # cheese	6-8 eggs	8 oz	None	325°F, Water bath
Quiche	1 qt. milk	6-8 eggs	None	None	325°F, Water bath

Custard Thickening Agents

Eggs are the primary thickening agent due to the **protein coagulation** that occurs when heated



Egg yolks are especially crucial for their ability to create smooth and rich textures

Eggs **coagulate** (thicken) when heated

Custard Thickening Agents

Starches like cornstarch are often added to enhance thickening and control overall consistency

Adding **starch** can help prevent the eggs from **curdling**

- **Cornstarch:** results in a thick, firm consistency
- **Flour:** produces a velvety texture
- **Arrowroot powder:** thickens at a lower temperature, making it suitable for custards not being boiled

Preparation for Custards

- Delicate process, requires careful attention
- Always gather all ingredients and equipment in advance – **mise en place** is essential
- **Time** and **temperature** is key
- Follow each step exactly for consistent results

Boiled Custard

A custard that is **cooked on the stovetop** until thickened, using both eggs and starch as thickening agents

Characteristics:

- Smooth, creamy texture
- Cooked to a boil, but stabilized with starch to prevent curdling
- Commonly used as a **filling or base** of other desserts

Examples:

- Pastry cream
- Banana cream pie filling

Boiled Custard Method

1. Bring 90% of the milk and ½ of the sugar to a boil
2. In a separate bowl, combine the remaining sugar with the starch (this helps prevent lumps)
3. Add remaining 10% of milk to the sugar-starch mixture to form a smooth slurry.
4. Whisk in the eggs to the slurry until fully combined, creating a liaison

Boiled Custard Method

5. Temper the egg- starch mixture by slowly whisking in some of the hot milk
6. Return the tempered mixture to the saucepan and cook over medium heat, stirring constantly

Boiled Custard Method

7. Bring to a boil on med heat and cook for about 1 minute until custard thickens
8. Remove from heat and add butter
9. Cool quickly, placing plastic wrap directly on the surface to prevent a skin from forming

Baked Custard

- All thickening comes from eggs
- Bake in a low temperature oven to gradually set
- Baked in a pie shell or in a water bath bain-marie (double boiler)
- Should be allowed to cool and set completely before serving

Examples:

- Crème brûlée,
- Cheesecake
- Pumpkin pie

Baked Custard Method

1. Preheat oven to a low temperature (300°F) *Bake Custards LOW AND SLOW*
2. Heat milk or cream. Combine with beaten eggs, sugar and flavorings
3. Strain the mixture to remove any lumps for a smooth finish
4. Pour into ramekins or baking dish

Baked Custard Method

5. Place the containers in a water bath (bain-marie) – hot water should come halfway up the sides
6. Bake gently until just set- the center should jiggle slightly when shaken
7. Remove from the oven, cool, then refrigerate until fully set

What is Stirred Custard?

A custard that is cooked gently on the stovetop while being constantly stirred, resulting in a pourable, creamy texture

- Smooth and silky
- Must be stirred constantly to avoid curdling
- Typically cooked to nappe consistency (Coats the back of a spoon)

Examples: Crème anglaise, ice cream base

Stirred Custard Method

1. Whisk together egg yolks and sugar until light and pale
2. Heat milk or cream (sometimes with flavoring) until steaming, not boiling
3. Temper the eggs by slowly whisking in a small amount of the hot liquid
4. Gradually return the mixture to the saucepan, whisking constantly

Stirred Custard Method

5. Cook over low heat, stirring constantly with a wooden spoon or spatula
6. Heat until it thickens slightly and reaches (170°-180°F), or coats the back of a spoon
7. Remove from heat immediately and strain through a fine mesh sieve to ensure smoothness
8. Cool quickly over an ice bath, then refrigerate

Sugar Cooking

Sugar Cooking

- How do I keep my sugar from crystalizing?
  - Use a clean, small pot
  - Use clean sugar
  - Use clean tools
  - Cook on high, even heat
  - Brush down the sides with clean water using a clean brush
- Gently stir until the syrup boils to dissolve the sugar
  - Once it boils – stop stirring!
  - Agitation promotes crystallization

Cleaning Up After Sugar

- **Success:** fill pot with water, bring back to a boil, pour down the drain, wash
- **Burnt:** do not fill the pot with water, put pot under station, let cool. When cool fill with water, bring back to a boil, pour down the drain. Repeat as necessary.
- Never return dirty or burnt pots

Binding Agents

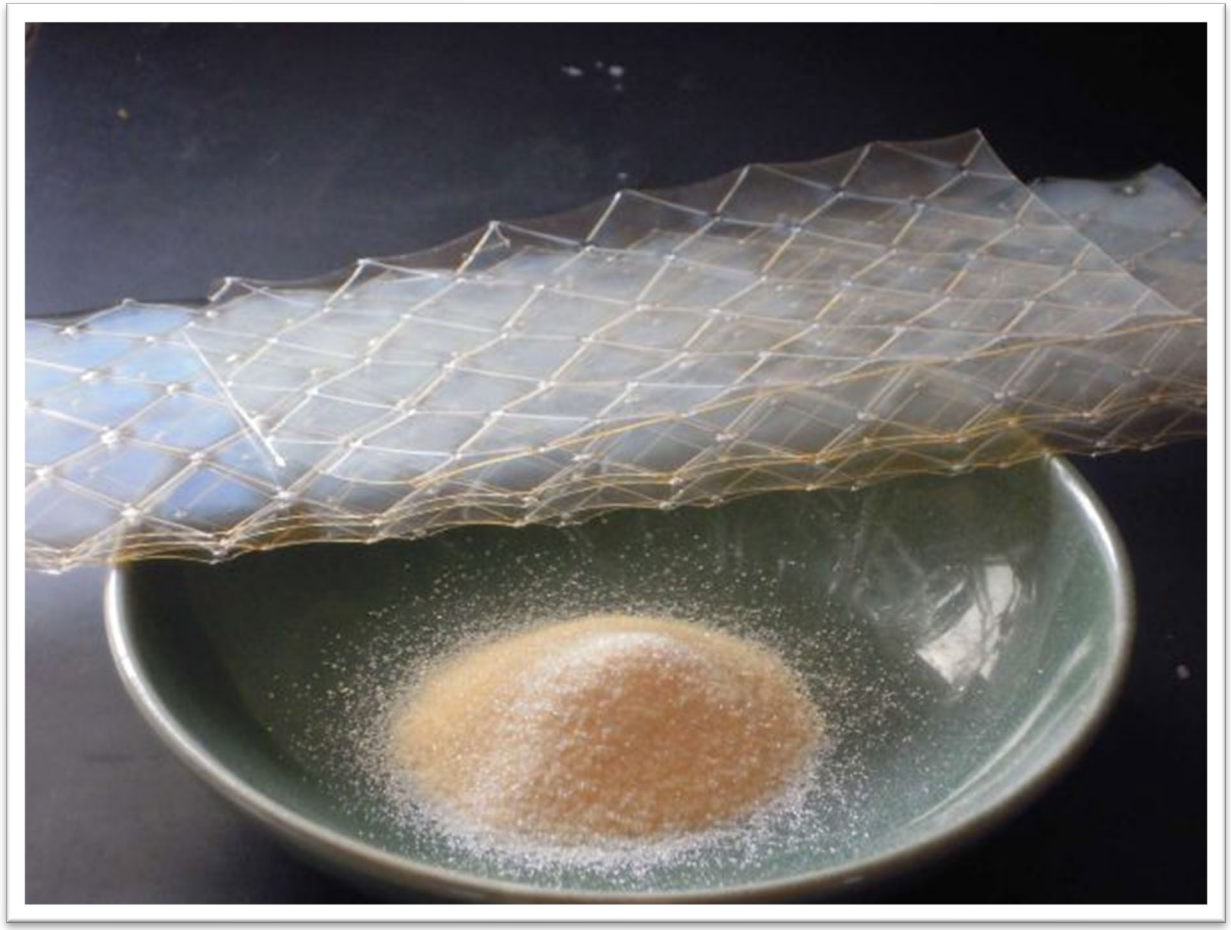
Binding Agents

- Gelatin
- Agar Agar
- Pectin

Gelatin

- Collagen from bones, connective tissue, cartilage
  - Pork (most common), beef, and fish available
  - There is no such thing as vegetarian gelatin
- Bond destroyed by *Bromelain* enzyme
  - Raw pineapple, tropical fruits
  - Can be cooked out, but changed flavor profile

Gelatin



- **Types:** Powdered and sheet; both must be bloomed + dissolved
  - **Bloomed:** ice water for 15 minutes
  - **Dissolved:** melt to 110-120°F, temper into base

Preparing Gelatin

1. Scale out the gelatin sheets
2. Bloom: Bloom the gelatin sheets in a large volume of ice water
   - Squeeze out extra water
   - Will soften dramatically
3. Melt: 2 possible ways:
   - Add directly to a warm liquid (about 100°F to 110°F)
   - Warm mixture over a hot water bath until 110°F to 140°F
4. Combine the gelatin with the base

Agar Agar

- Natural gelatinous substance derived from red algae
- Short-textured binding agent (feels crumbly in your mouth)
- **Forms:** powder, flakes, or bars
  - Powder is the most concentrated and easiest to measure

Preparing Agar Agar

1. Combine agar with some of the sugar – this will help prevent clumping
2. Whisk the agar sugar mixture into cold liquid (water, juice, milk) before heating to prevent clumping
3. Bring the mixture to a boil in a saucepan
4. Simmer for 1–2 minutes, stirring constantly to ensure it fully dissolves
5. Pour into molds
   - It sets at room temperature but placing it in the fridge makes the process faster

Agar Agar Tips

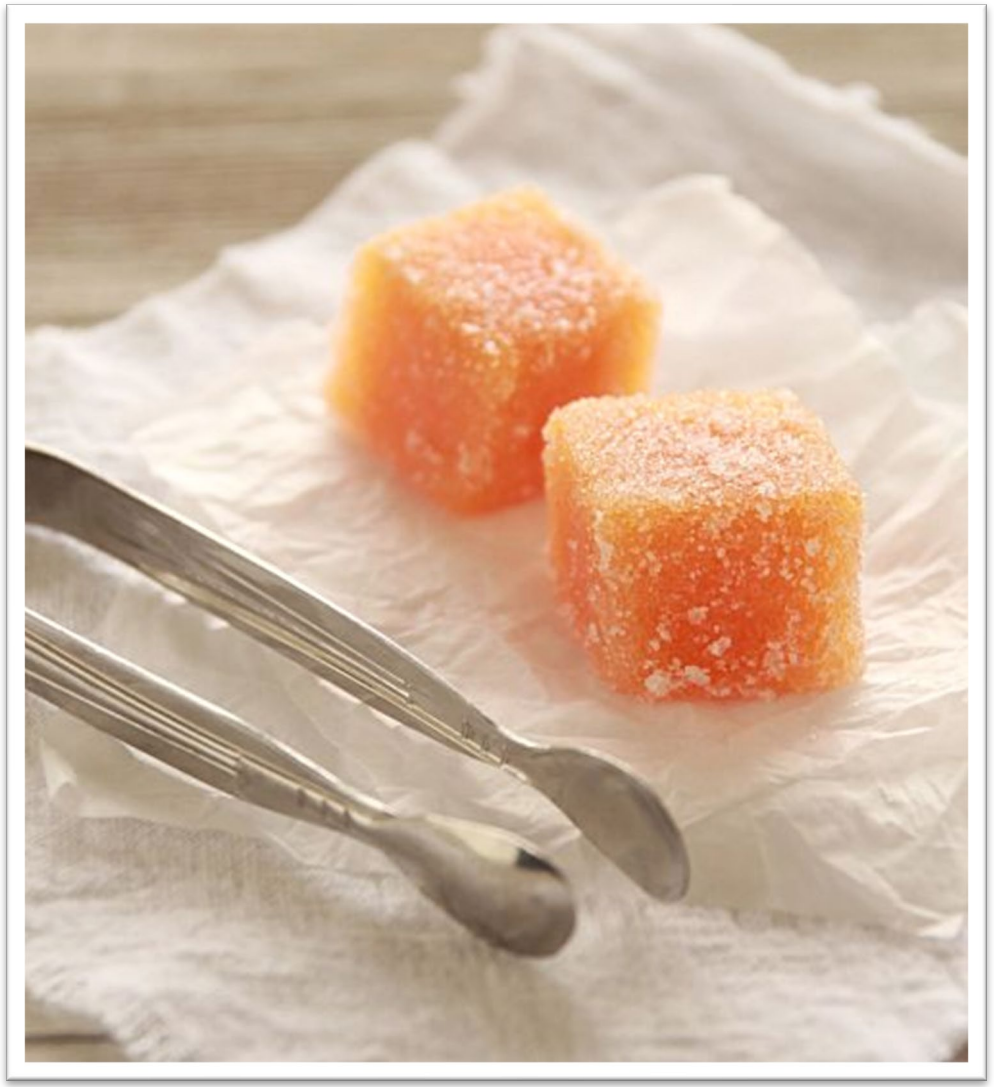
- Does not melt at room temperature (unlike gelatin)
- Always mix into cold liquid, boil for 1–2 minutes to activate
  - Will clump in hot liquids
- Acidic ingredients (like citrus) may need more agar to set
- Agar and gelatin are not interchangeable weight for weight, different textures

Pectin

- Fiber found in most plants; holds together cell walls, thread-like carbohydrate
- Found in almost all produce
  - Especially in skin, peels, and cores of apples, blueberries, cranberries, plums
- Gel-like texture when boiled, essential for jams, gummy candy (ex. Pate de Fruit)
- Needs acid and sugar to set

Preparing Pectin

1. Combine the pectin with sugar to keep it from clumping
2. Add the pectin to cold liquid
3. Bring to a boil and cook to desired thickness or temperature
4. Add the acid at the end
5. Quickly deposit into molds



Pectin Tips

- **Overcooking:** boiling too long after adding pectin can break it down, causing the mixture to fail to set
- Need high sugar content + acid
- Sets quickly, get into molds fast

Daily Plan: **Chef Demos**

- Salted Caramel Sauce
- Vanilla Tart Dough
- Coffee-Chocolate Crémeux
- Milk Chocolate-Coconut Whipped Ganache

Daily Plan: **Production Assignments**

Team 1

- Goat Cheese Cheesecake
- Mango-Guava Coulis
- Guava Gelee
- Coconut-Vanilla Whipped Ganache

Team 2

- Caramel (for Ramekins)
- ‘Ulu Flan Custard (Make and Bake)
- ‘Ulu Shortbread Dough

Team 3

- Rice Pudding
- Passionfruit Curd
- Mango Compote
- Crumble Topping

Team 4

- Chocolate Tart Dough
- Milk Chocolate-Caramel Whipped Ganache
- Chocolate Creamy
- Chantilly Gelatin
- Salted Caramel Crémeux

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Any Questions?