Thickening Agents and Methods

Description
Students will gain an understanding of the gelatinization process and will be able to identify two thickening agents and how to prepare them. They then will perform different cooking methods used to thicken a liquid.

Lesson Objectives
Students will be able to:

• identify a starch (flour) and how it absorbs a liquid in the gelatinization process
• prepare a roux (flour and fat) and a slurry (flour and water)
• identify various stages of a roux when it is cooked
• prepare a whitewash using cornstarch and cold water, and
• thicken a prepared sauce or stock through reduction.

Assumptions

• The teacher will become familiar with the process of gelatinization and evaporation using the resources available.
• The teacher will explain that starch needs to be separated in fat (roux) or suspended in water (slurry and whitewash), and will demonstrate the preparation of a roux, slurry, and whitewash.
• The teacher will be able to demonstrate evaporation of a liquid resulting in a reduction.

Safety Considerations

General

• Use of proper PPE (personal protective equipment) at all times.
• All food safety procedures must always be reinforced. For example, keep hot foods hot and cold foods cold.
• Spills must be cleaned up immediately. Students are to notify the teacher of any broken glass or cooking tools.
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Lesson-specific
• Students must be made aware that hot liquids can boil over, causing spills and burns. Liquids can also splatter and/or create steam, resulting in a burn.
• Students may need to modify how they carry the pot with two protected hands on either side of the pot. If it’s too heavy, students may need to modify their position or have another person do the heavy lifting. Use a cart or trolley if necessary.
• Heat-resistant tools should be used.

Terminology

au sec: Au sec (Fr.) refers to a liquid that has been heated and reduced until it becomes sticky and nearly dry.

boil: To boil is to cook foods quickly in rapidly boiling water (or another liquid) at 100°C (212°F). Starch needs the liquid to boil to become absorbed and not taste pasty.

gelatinization: Gelatinization is the absorption of water in starch, producing a gel.

gluten: Gluten is a composite of proteins found in cereal grains, especially wheat, that gives dough its elasticity.

roux: A roux (Fr.) is a mixture of equal parts of flour and fat stirred together and used to thicken sauces.

slurry: A slurry is a thickening agent that includes a smaller amount of flour introduced into a larger amount of water and stirred, resulting in the starch being suspended in the water.

starch: Starch is a white, odourless, and tasteless carbohydrate that is the chief form of stored energy in certain plant material, especially cereals and potatoes.

stir: Stirring is a cooking technique for separating starch granules so lumps are smoothed out. Usually done with a whisk or spoon in a saucepan.

whitewash: A whitewash is a thickening agent made from a smaller amount of cornstarch mixed into a larger amount of water and stirred, resulting in the starch being suspended in the water.

Estimated Time
This theory and practical can be included in other Activity Plans. Teachers can cover when demonstrating in other modules.

70 minutes total:
• 30 minutes for roux-based recipe
• 20 minutes for cornstarch or slurry-based recipe
• 20 minutes for reduction explanation

Recommended Number of Students
Up to 24
Facilities
Home Economics teaching lab and/or Culinary Arts teaching kitchen

Tools
- cheesecloth (optional)
- container for storage
- saucepan
- scraper
- spoon
- strainer—conical or sieve
- whisk

Resources
Teachers can find demonstrations online, but they must preview to watch for correct sanitation practices, temperatures, and organization.

Rouxbe Cooking School. Online lessons.
https://rouxbe.com/cooking-school/
Demonstrating Skills And Knowledge

Procedure

Teacher-led Activity
1. Introduce thickening agents and describe the process of gelatinization.
2. Demonstrate the preparation of a roux, mixing equal parts of fat and all-purpose flour.
3. Demonstrate cooking the roux and explain that the starch will turn a variety of colours.
4. Explain that cooking the roux for longer results in the final product having a different flavour and colour.
5. Demonstrate how to prepare a slurry. Emphasize the importance of stirring the starch before it is added to a liquid.
6. Demonstrate how to prepare a whitewash. Emphasize the importance of stirring the starch before it is added to a liquid.
7. Demonstrate the reduction of a liquid.

Student-led Activity
1. Students will prepare a roux and cook and taste it as the starch turns brown. Milk will be added to three different stages of cooking the roux and it will be cooked until thick. Students may observe and taste the three different sauces to compare their appearances and flavours.
2. Students will prepare a slurry and cook it until thick to observe the gelatinization process.
3. Reduction will be demonstrated by cooking whipping cream on medium heat for 15 minutes to notice how thick it becomes.

Evaluation Guidelines
The results of the student-led activity will meet the following requirements:
- desired consistency
- desired texture
- appropriate colour showing that the starch has cooked in the roux

The student will:
- work cleanly and safely
- be organized
- follow procedure with proper ingredients
- be enthusiastic and take initiatives including tasting the product to understand it
- show self-direction in helping others
- show good judgment about when to get help, and
- show an interest in fairness for others.
Extension Activities

The roux-based sauce method can be included in these types of recipe:

- cheese sauce for broccoli
- cream soup
- cream sauce for pasta or meat
- brown sauce for roast meat
- casserole