Choux Pastry: Preparation and Baking

Unit: Preparing Foods

Problem Area: Baking and Pastry

Lesson: Choux Pastry: Preparation and Baking

Student Learning Objectives.

Instruction in this lesson should result in students achieving the following objectives:

1. **Summarize basic choux pastry ingredients and equipment**
2. **Preparing choux pastry**
3. **Baking choux pastry**

Resources.

The following resources may be useful in teaching this lesson:

"How to Make Choux Pastry (Pâte á Choux)," *Sally's Baking Addiction.* Accessed July. 23, 2019. http://sallysbakingaddiction.com/choux-pastry.

"How to Make Perfect Choux Pastry," *The Flavor Blender.* Accessed July. 23, 2019. http://www.theflavorblender.com/how-to-make-perfect-choux-pastry/.

Huff, Tessa. "Baking School Day 2: Pâte á Choux," *Kitchn*. Accessed July. 23, 2019. http://www.thekitchn.com/baking-school-day-2-pâte-á-choux-222480.

Suas, Michel. *Advanced Bread and Pastry A Professional Approach*. Delmar, Cengage Learning, 2009.

The Culinary Institute of America. *The Professional Chef*, Ninth Ed. John Wiley & Sons, Inc, 2011.



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Equipment, Tools, Supplies, and Facilities

- ✓ Overhead or PowerPoint projector
- ✓ Visual(s) from accompanying master(s)
- ✓ Copies of sample test, lab sheet(s), and/or other items designed for duplication
- ✓ Materials listed on duplicated items
- ✓ Computers with printers and Internet access
- ✓ Classroom resource and reference materials

Key Terms.

The following terms are presented in this lesson (shown in bold italics):

- ➤ beat
- ➤ choux
- ➤ choux pastry
- ➤ dorure
- ➤ emulsion
- ➤ gelatinize
- ➤ pâte
- ➤ pâte á choux
- ➤ score
- ➤ sifting

Interest Approach.

Use an interest approach that will prepare the students for the lesson. Teachers often develop approaches for their unique class and student situations. A possible approach is included here.

> *The word "pâte" (French for "dough", "paste", or "batter" is classically used as a descriptor for a category of products, which are the building blocks of many traditional and contemporary pastries. Write the term Pâte á choux on the board, ask your students what they think the term means. Explain the French translation and demonstrate patting your shoe to help students remember how to correctly pronounce the term. Purchase various choux pastries to show students or project pictures to the class. [See VM] Ask students if they can identify any of the choux pastries. Have students analyze the characteristics of the pastries to determine what ingredients may be used to prepare the pastry as well as further to explore how that pastry may be prepared. Give clues as needed: "What are typical ingredients used in baked goods? Look at the color, texture, density (if in person)." Use visuals throughout the lesson as needed.*

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CONTENT SUMMARY AND TEACHING STRATEGIES

Objective 1: Summarize basic choux pastry ingredients and equipment

Anticipated Problem: What is choux pastry? What are the basic ingredients in choux pastry? What standard equipment is required to make choux pastry?

I. ***Choux pastry*** or ***Pâte á Choux*** is a classic French pastry preparation that uses two stages of preparation: cooking the paste and baking the paste.

A. PATE A CHOUX: The word "***pâte***" is French for "dough", "paste", or "batter" and is used as a descriptor for a category of products, which are the building blocks of many traditional and contemporary creations. The consistency of the paste is thicker than a batter, but not quite as stiff as a dough. The word derivation of "***choux***" is French for "cabbage" and historically refers to the irregular shape it takes on as it bakes. Once baked, the pastry crusts on the outside, creating a puffed shape and a hollow interior. The crisp shells are filled with a variety of creams and finished with a glaze.

B. HISTORY: Pâte á choux has roots back to the 16th century and originally was made by adding eggs to a paste made from potatoes. The dish is still made today and is known as pommes dauphine. The Pâte á choux recipe was perfected by Antoine Carême in the 19th century and his recipe is still used today.

C. INGREDIENTS: Pâte á choux is a combination of milk and/or water, butter, margarine or shortening, sugar, salt, pastry flour, and whole egg. This lesson covers the basic ingredients used in preparing choux paste, but for a full description of ingredients and their functions, refer to the Baking Basics reference document found in the MyCommunity section of MyCAERT.

1. LIQUID: The use of milk gives the choux more color during baking and creates a more tender pastry, whereas water allows for baking at a higher temperature. Generally, a combination of both water and milk will be used.
2. FAT: Unsalted butter is typically used for the fat; however, margarine and shortening can be used as well.
3. FLOUR: Pastry flour is used for its weaker protein content, preventing the dough from distorting too much during the baking process. If bread flour is used, the paste will require more hydration and the paste may be tough and will not expand well in the oven.
4. SWEETENER: A small amount of sugar is usually added, lending a slightly sweet flavor as well as aiding in coloration.
5. SALT: Salt rounds off the flavors, helping to bind the water to the paste and ultimately making a smoother dough.

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6. EGGS: Eggs should be at room temperature to ensure easy incorporation into the paste. [Tip: Using fresh eggs will ensure the optimal flavor]

D. HAND TOOLS AND EQUIPMENT: Basic hand tools and equipment are necessary for creating a light and airy pastry. For a full description of hand tools and equipment, refer to the baking basics reference document located in the MyCommunity section of MyCAERT. The following list is the basic tools and equipment needed to prepare choux paste:

1. Liquid measuring cup
2. Scale to weigh out ingredients or dry measuring cups and spoons
3. Sifter
4. Pot (large enough to hold the liquid, fat, and flour, with enough room to stir vigorously with no spillage)
5. Rubber Spatula or cooking spoon
6. Stove
7. Whisk, electric hand mixer or stand mixer with paddle attachment
8. Mixing bowl
9. Pastry bag with piping tip or zipped top bag for piping
10. Parchment paper
11. Pastry brush
12. Baking sheet
13. Oven

Teaching Strategy: *Many techniques can be used to help students master this objective. Use VM–A through VM–C to facilitate a discussion of what pâte á choux is and what ingredients are used to make it.*

Objective 2: Preparing choux pastry

Anticipated Problem: What is mis en place? How is choux pastry prepared?

II. Preparation of choux pastry requires many steps, ingredient preparations, tools and equipment pieces and should all be discussed thoroughly when preparing this delicate pastry.

A. MISE EN PLACE: Before mixing, the baker must follow the rules of mise en place. ***Mis en place*** is a French cooking term that means “to set up” or “to arrange.” The baker should:

1. Read the entire recipe.
2. Collect all of the ingredients and allow them to come to room temperature (with the exception of milk, which should usually remain refrigerated until use.)
3. Measure all ingredients accurately, preferably by weighing.
4. Follow processes requested by the recipe, ensuring ingredients are at room temperature and the flour has been sifted.

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5. Prepare the workstation by cleaning the area, gathering tools (spatula, liquid measuring cup, sifter, etc.), and arranging equipment (such as a stand mixer) as required.
6. Preheat the oven.
7. Prep baking sheet with parchment paper and prep piping bag with piping tip.

B. PREPARATION

1. STEP ONE: Mise en place should be done. Bring ingredients to room temperature (68°F to 70°F) prior to mixing. Weigh all ingredients separately. Sift flour [***sifting*** is the process of passing a dry ingredient, such as flour, through a bottom sieve. This process combines air with the ingredient being sifted, making it lighter and more uniform in texture, which improves the baking or food preparation process.] Preheat the oven. Prepare piping bag fitted with decorating tip. Place an ungreased parchment liner on a full sheet baking sheet.
2. STEP TWO: To begin a pâte á choux, the liquid, fat, salt, and sugar are combined in a stainless-steel pot and are brought to a boil.
3. STEP THREE: It is crucial to heat this mixture slowly at first to ensure the fat melts evenly as the mixture warms. If there is too much water evaporation [via steam], the emulsion [an ***emulsion*** is a combination of two or more liquids (that are naturally repellent) into a smooth mixture.] could break after the flour is added.
4. STEP FOUR: One mixture has boiled, it is then removed from the heat and the flour is added entirely. Stir the mixture until a thick paste forms.
5. STEP FIVE: Return the mixture to the stove, on low heat, and stir the mixture just until the flour pulls away from the sides of the pot. During this step, the starch in the flour is hydrated and binds with the liquid mixture (butter, milk, and water). This will help stabilize the emulsion. It is very important not to overcook the paste.
6. STEP SIX: The paste is then transferred to a mixer fitted with a paddle attachment and is beaten [to ***beat*** is cooking term that means to rapidly stir a batter with a mixer or whisk, to thoroughly incorporate the ingredients along with air] for a few minutes.
7. STEP SEVEN: Add three-fourths of the egg and after it is fully incorporated, the rest is added to achieve the proper texture of the batter. If all egg has been added and the batter is stiff, add warm milk to adjust the paste to the proper consistency. [NOTE: Whether or not milk is added, as well as how much milk is added, depends on the age, quality and moisture content of the flour.] It is important not to overmix pâte á choux (which happens easily when using a when using a machine for mixing). If the paste is too dry, there will not be sufficient steam generation during the baking process, to leaven the paste, and if the paste is too wet, it will not be able to hold the shape that the steam creates. Properly made pâte á choux should have a shiny, smooth appearance, and it should not be too soft.

C. SHAPING/PIPING: Transfer the paste to a piping bag, fitted with a decorative tip to aide in the shape of the end result. [NOTE: If a piping bag and/or piping tip is not

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available, you can also use a zipped-top bag and cut off the corner for easy piping.] Piping the paste on parchment paper is the best nonstick surface for this choux pastry dough. [HINT: Before piping the dough, moisten the parchment paper with water. WHY? Eggs need a moist and humid environment in the oven to properly rise and avoid drying out and burning. Water moistened parchment paper = perfectly puffed up pastries with a deliciously light center and crisp exterior. Pastry perfection!]

1. Your chosen choux pastry recipe will determine how your paste should be piped onto the parchment paper. For specific directions for each choux pastry, refer to the lesson CA C8–14 Choux Pastry: Desserts. However, choux pastry can be piped in round mounds for profiteroles/cream puffs or elongated for eclairs.
2. After a pâte á choux is piped, it can be brushed with a ***dorure***, an egg wash of beaten egg or egg yolk, thinned with milk or water. The process of brushing an egg wash on dough before baking, just like with pies, gives choux pastries a rich, golden color and a bit of a glossy shine. When applying the dorure, aim for a thin, even layer for more even coloring. You can use a pastry brush to apply as well as to press down any small peaks that may have formed from the piping process. Allow the choux to rest for 20 minutes in the open air to develop a skin; this helps maintain the shape during the baking process.
3. Once egg washed, the pâte á choux can be scored and is ready for baking. The cooking term ***score*** refers to the shallow cuts made in the surface of meat, fish, bread or cakes. Scoring has several purposes, such as decorating the food and tenderizing. Cakes are scored to indicate where the cake should be cut without actually cutting it. The purpose of scoring the pâte á choux is to help encourage an even expansion of the paste in the oven. An easy way to score the paste is the ident the surface slightly with a fork in a crisscross pattern.

Teaching Strategy: *Many techniques can be used to help students master this objective. Use VM–D through VM–E to facilitate a discussion of how choux pastry is prepared. Assign LS–A.*

Objective 3: Baking choux pastry

Anticipated Problem: How is choux pastry baked? How is choux pastry tested for doneness?

III. Heat is a major player in getting a good puff from your pâte á choux, so you want to ensure your oven has reached the correct temperature and is thoroughly heated before baking off the choux paste.

A. BAKING PROCESS: Baking pâte á choux is a multi-step process:

1. Starting with a medium-high temperature (350°F convection); this initial temperature heats the pastry quickly, creating the steam required for leavening. If

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the pastry becomes too hot, too much steam can be created and a misshaped or cracked pastry will result. The proteins from the egg and flour are stretched when they are warmed and held until they are set by oven heat.

2. Once the full volume is achieved and the crust begins to form, the temperature should be decreased to 325°F and the oven vent should be opened.
3. Some might wonder how these pastries rise without any leavening agent, it's all about the steam! The heat from the hot oven causes the liquid in the paste to quickly evaporate and turn to steam. The steam rapidly expands the paste, leaving behind hollow pockets of air with a crisp outer shell.

B. TESTING FOR DONENESS: Pâte á choux should be baked until it is golden brown and "dry" in the center. This could be tested by breaking open a piece out of the oven and feeling the moisture level on the inside of the pastry. Ironically, it should feel slightly moist. If pâte á choux is prematurely removed from the oven, the pastry is at risk of collapsing due to the excessive moisture from within the pastry evaporating through the crust and making it weak.

C. SCIENCE BEHIND CHOUX PASTRY: The double cooking of the choux paste helps produce the light, airy interior texture.

1. Heating the flour, the first time causes the starch to ***gelatinize***, in which the starch granules swell when combined with the liquid (in this recipe milk and/or water). By gelatinizing, the starch will help support the structure of gluten when the steam inflates the pastry. This structure will also help hold the steam. The first cooking will also help alter the gluten molecules, so the dough is less elastic. [NOTE: Think of a rubber band, new rubber bands stretch and snap back, the dough would be like an old rubber band that stretches but does not snap back all of the way.] The steam will push out the dough to form bubbles and instead of snapping back right away, the bubbles stay stretched out. The starch structure will help support and prevent the steam from escaping.
2. When baking the choux paste, it is first baked at a high temperature and finished at a lower temperature. The initial high temperature is what will create the steam to cause it to rise.

Teaching Strategy: *Many techniques can be used to help students master this objective. Use VM–F to facilitate a discussion of how to bake choux pastry and how to check for doneness.*

Review/Summary. Use the student learning objectives to summarize the lesson. Have students explain the content associated with each objective. Student responses can be used in determining which objectives need to be reviewed or taught from a different angle. If a textbook is being used, questions at the ends of chapters may also be included in the Review/Summary.

Application. Use the included visual master(s) and lab sheet(s) to apply the information presented in the lesson.

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Evaluation.

Evaluation should focus on student achievement of the objectives for the lesson. Various techniques can be used, such as student performance on the application activities. A sample written test is provided.

Answers to Sample Test:

Part One: Matching

1. f
2. c
3. a
4. e
5. b
6. d

Part Two: Completion

1. T
2. T
3. F
4. F
5. T
6. F

Part Three: Short Answer

1. Answers may vary and would be similar to the following. Pâte á choux is made by cooking water and/or milk, butter, flour and eggs into a smooth batter. Milk is used to provide flavor but water allows the choux to be cooked at a high temperature to create the steam. Usually, a combination of milk and water are used for the liquid. There is no leavening agent used among the ingredients. Added ingredients can be used to change the flavor and appearance of the pâte á choux, such as cheese, herbs, spices etc.
2. Answers may vary and would be similar to the following. Choux pastries are leavened by steam. The heat from the hot oven causes the liquid in the paste to quickly evaporate and turn to steam. The steam rapidly expands the paste, leaving behind hollow pockets of air with a crisp outer shell.

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Sample Test

Name _____

Choux Pastry: Preparation and Baking

Part One: Matching

Instructions: **Match the term with the correct definition.**

a. eggs
b. dorure
c. mis en place
d. pâte
e. choux
f. emulsion

_____1. A combination of two or more liquids, that are naturally repellant, into a smooth mixture.

_____2. French cooking term that means “to set up”

_____3. Should be at room temperature to ensure easy incorporation into the paste

_____4. French for “cabbage”

_____5. An egg wash of beaten egg or egg yolk

_____6. French for “dough”

Part Two: True/False

Instructions: **Write *T* for true or *F* for false.**

_____1. A piping bag or zipped top bag is used to form the choux pastry.

_____2. The use of milk gives the choux more color during the baking process.

_____3. Bread flour is the best flour choice to make choux pastry.

_____4. A combination of baking powder and baking soda is used to leaven the choux pastry.



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_____5. It is important to sift the flour prior to preparing choux pastry.

_____6. Folding is a mixing method that is very important to preparing choux pastry.

Part Three: Short Answer

Instructions: **Answer the following.**

1. Identify the main ingredients in making pâte á choux.

2. Describe how pâte á choux is leavened, if there are no leavening agents used to prepare the choux paste.

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PÂTE Á CHOUX PASTRIES

Pâte á choux bakes up into golden brown, crisp pastries. Inside these light pastries are mostly air pockets with a bit of moist dough. They can be filled with sweet cream, custard, fruit or even savory mixtures. The dough is most often piped into rounds for cream puffs, fingers for eclairs or rings for Paris Brest. The paste may also be piped or spooned into specific shapes and deep-fried for doughnut-type products known as beignets, churros and crullers.













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CHOUX PASTRY: WHAT IS PÂTE Á CHOUX? WHAT IS IT MADE FROM?

Pâte á choux is a classic French pastry preparation that uses two stages of preparation: cooking the paste and baking the paste. Pâte á choux is a combination of milk and/or water, butter, sugar, salt, flour and whole egg. The milk gives the choux more color, whereas the water allows for baking at a higher temperature. Generally, a combination of both is used. The pastries are leavened by steam during the baking process, therefore there is no leavening agent among the ingredients.



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CHOUX PASTRY: WHY DO WE SIFT THE FLOUR?

Sifting is the process of passing a dry ingredient, such as flour, through a bottom sieve. This process combines air with the ingredient being sifted, making it lighter and more uniform in texture, which improves the baking or food preparation process. Failing to sift the flour while making choux pastries can interfere with the smoothness of the pastry.



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CHOUX PASTRY: PREPARING THE PASTE

To begin, pâte á choux, the liquid, fat, salt and sugar are combined in a pot and are brought to a boil. It is important to heat slowly to ensure the fat melts evenly as the liquid warms. Once boiled, remove from the heat, add the flour all at once and stir until a thick paste forms. Return the mixture to low heat and stir until the flour pulls away from the sides of the pot.



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CHOUX PASTRY: SHAPING THE PASTE

Transfer the choux paste into a piping bag fitted with a desired piping tip. Pipe the paste onto prepared baking sheets according to the desired result. Pâte á choux can be piped into round mounds for cream puffs or profiteroles or oblong for eclairs. Allow the choux to rest for 20 minutes in the open air to develop a skin; this helps maintain the shape during the baking process.





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CHOUX PASTRY: BAKING PÂTE Á CHOUX



Before baking, brush the pâte á choux with a dorure (egg wash), which will give your pastry a rich, golden color and a bit of a glossy shine. Ensure you are using a preheated oven at the correct temperature, this will provide an environment conducive for the appropriate leavening of the pastry. Pâte á choux should be baked until it is golden brown and "dry" in the center. This can be tested by breaking open a piece out of the oven.



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LS–A

Name _____

Preparing Choux Pastry

Purpose

The purpose of this activity is to prepare a basic choux pastry recipe.

Objective

Research, plan and prepare a basic choux pastry recipe.

Materials

- lab sheet
- recipe for cream puffs
- food supplies and equipment (as needed to prepare the pate a choux)

Procedure

1. Access the Sally's Baking Addiction video recipe, for "Homemade choux pastry," at http://sallysbakingaddiction.com/choux-pastry/.
   a. Read through Sally's page on how to prepare choux pastry.
   b. Watch the video demonstration and listen to the instructions.
   c. Review the choux pastry recipe. (NOTE: This recipe can be printed from this website link.]
2. Using classroom standard practices, plan for the preparation of the choux pastry. Have your instructor approve the lab plans.
3. Conduct mis en place. As directed, prepare and bake the choux pastry. Follow standard safety and sanitation rules. Use proper techniques to ensure proper leavening of the choux pastry.
4. Remove the choux pastry from the oven. Follow recipe directions for cooling.
5. Turn in your completed lab sheet (and pastries) to your instructor.
6. OPTIONAL: Take pictures of the dish or food item for your culinary arts portfolio.



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