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CULINARY
INSTITUTE OF
CHILD NUTRITION

CULINARY QUICK BITES

DEVELOPING FLAVOR: BASIC
OVERVIEW OF THE MAILLARD
REACTION AND CARAMELIZATION



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DEVELOPING FLAVOR: BASIC OVERVIEW OF THE MAILLARD REACTION AND CAMELIZATION

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The University of Mississippi, School of Applied Sciences
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TRAINING OVERVIEW

The Culinary Quick Bites training series is a tool to help child nutrition professionals develop and refine their culinary skills. Each lesson is designed to last approximately fifteen minutes. Each lesson should be facilitated (led) by the person responsible for overseeing food production at a meal site, service area, or the district level.

Training facilitators should review the training, in its entirety, prior to conducting the training.

This training has been developed to address a variety of learning styles. The training includes an overview of the topic presented by the facilitator, an infographic to reinforce the training topic visually, a video to demonstrate the topic, and an activity to reinforce learning.

Please contact the Institute of Child Nutrition Help Desk at 1-800-321-3054 or helpdesk@theicn.org if you have any questions about how best to facilitate this training.

KEY AREA

Key Area: 2 – Operations

PROFESSIONAL STANDARDS

FOOD PRODUCTION – 2100

Employee will be able to effectively utilize food preparation principles, production records, kitchen equipment, and food crediting to prepare foods from standardized recipes, including those for special diets.

2130 – Develop culinary skills necessary for school meal preparation.

FACILITATOR'S NOTES

This training counts for 15 minutes of training credit under USDA Professional Standards learning objective 2130 – Develop culinary skills necessary for school meal preparation.

The activity at the end of the lesson involves browning and caramelizing onions. This activity helps reinforce knowledge and skills learned during this lesson. The onions prepared during this lesson may be included in the next day's menu production.

Before the training, prepare for the lesson activity and set up the kitchen workstation as described on page 11.

Deliver the lesson/training to participants:

- Read the lesson overview to the participants.
- Discuss the infographic and how it relates to the training topic.
- View the instruction video with participants.
- Answer any questions participants may have on the lesson, infographic, and video.

Complete the activity as instructed on page 11.

MATERIALS NEEDED



- Anti-slip mat – 1 per person
- Cutting board – 1 per person
- Chef knife – 1 per person
- Washed onion – at least 1 per person
- Waste pan – as needed
- Food pan – as needed
- Infographic: The Maillard Reaction and Caramelization – 1 per person
- Access to a screen to show the training video. Possible options include:
 - Site computer monitor with sound
 - Projector with sound
 - Tablets and smartphones
 - A QR code has been provided for quick access to the video on handheld devices.

LESSON OVERVIEW

OBJECTIVE:

At the end of the lesson, participants will be able to recognize how to use the Maillard reaction and caramelization to develop flavor in recipes for school meals.

GENERAL INFORMATION ABOUT THE MAILLARD REACTION AND CARAMELIZATION

- The **Maillard reaction** is a chemical reaction between protein and sugar requiring heat.
- The Maillard reaction creates flavor and produces food dark in color.
- During the Maillard reaction, sometimes known as browning, hundreds of flavor compounds are created. These compounds, in turn, break down to form additional and new flavor compounds. Each type of food has a very distinctive set of flavor compounds that are formed during the Maillard reaction.
- It is important to note that since the Maillard reaction produces water, having a high water activity environment (such as boiling or braising) stops the reaction.
- **Caramelization** is the browning of sugars.
- Like the Maillard reaction, caramelization also produces food with a dark color and a more complex flavor.
- Remember, even though these reactions are different, both the Maillard reaction and caramelization may take place at the same time. They each produce noticeably different, often complementary, flavors and aromas.
- While the change in color may produce a more aesthetically pleasing food product, the most important things about the Maillard reaction and caramelization are the flavors and aromas they produce. Foods such as onions and winter squash both brown and caramelize when roasted.

HOW TO USE THE MAILLARD REACTION AND CARAMELIZATION WHEN PREPARING YOUR RECIPES

- Utilizing the infographic, follow the steps to learn how to properly use the Maillard reaction and caramelization to develop flavor in your recipes.
- Review the embedded training video.

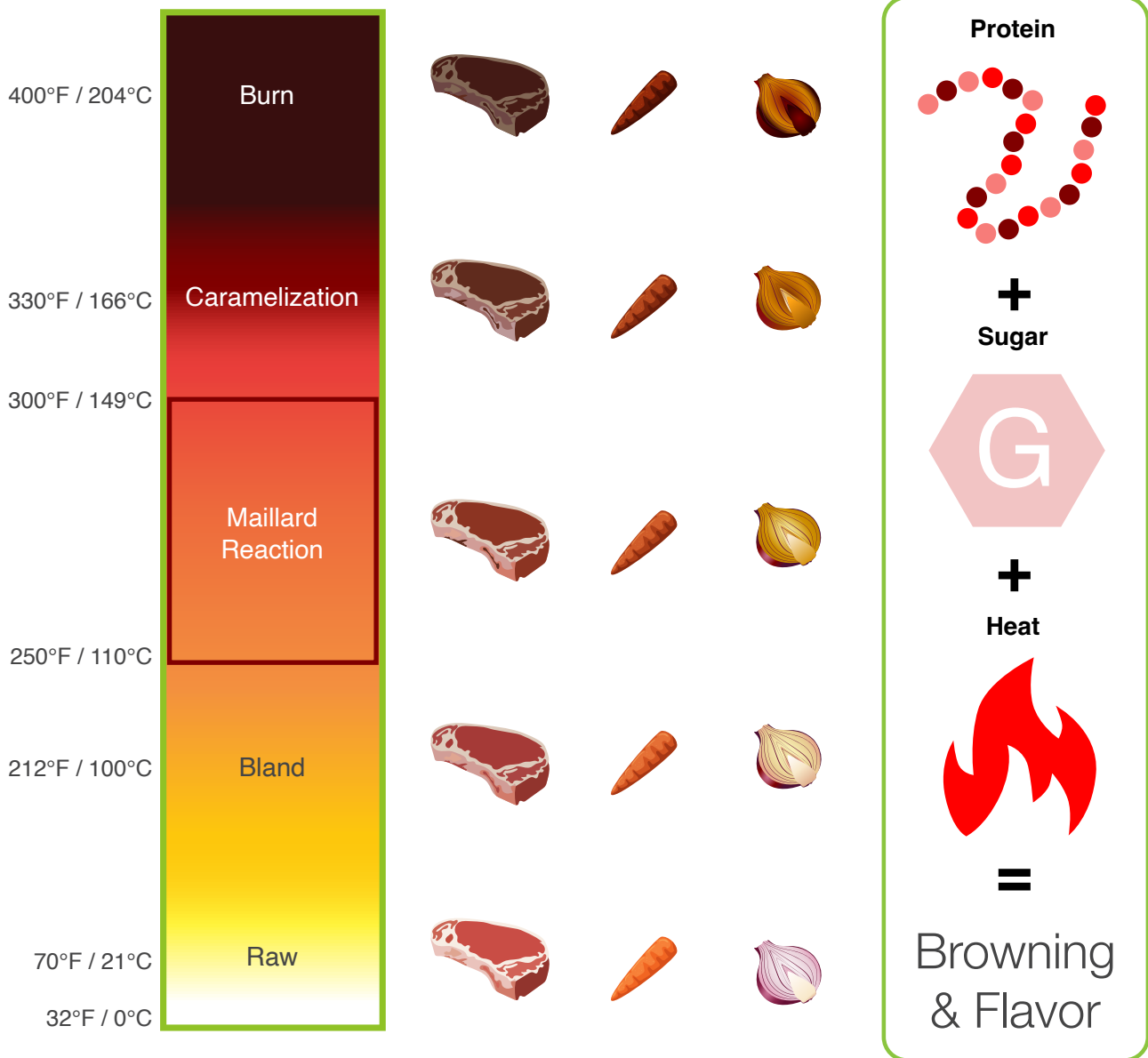
After we review the infographic and video, there will be an activity to reinforce skills learned.

Culinary Quick Bites
FLAVOR ENHANCEMENT

MAILLARD REACTION

The Maillard Reaction

- It all starts when heat is applied to a sugar and a protein/amino acid. The reaction forms a compound.
- These molecules react further to form aromatic compounds.
- In the final step large complex molecules are formed. These will eventually give the product a brown color.





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Basic Overview of the Maillard Reaction and Caramelization

[WATCH THE VIDEO](#)

<https://vimeo.com/695264382/20dff91a0>

QR CODE

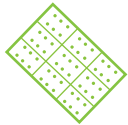
Utilize the QR code embedded to the right to share the video with staff utilizing handheld devices such as smartphones and tablets. Use the photo app on the smart device to scan the code to be directed to the video.



ACTIVITY

SETUP

MATERIALS:



Anti-slip mat
– 1 per person



Washed onion
– at least 1 per person



Infographic:
The Maillard
Reaction and
Caramelization
– 1 per person



Cutting board
– 1 per person



Waste pan
– as needed



Chef knife
– 1 per person



Food pan
– as needed

NOTE: If your site does not have enough materials for all participants to complete the activity simultaneously, divide participants into groups based on your materials. Allow enough time for each participant to complete the activity.

SETUP INSTRUCTIONS FOR FACILITATOR

NOTE: For programs needing training on how to dice an onion, please use the *Culinary Quick Bites Lesson: How to Dice Onion* as a prerequisite for this activity.

- 1** Prior to the training, gather all of the materials needed for the activity. Pre-wash the onions that will be used for the training. Set up a workstation for each participant with an anti-slip mat, cutting board, chef knife, and onions.
- 2** During the activity, remember to monitor and observe staff as they practice their culinary skills.

ACTIVITY INSTRUCTIONS FOR PARTICIPANTS

- 1** Refer the participants to the infographic. Then read the instructions for the activity. Ask the participants if there are any questions before beginning the activity.
- 2** Instruct all participants to wash their hands and put on single-use gloves before starting the activity.
- 3** Each participant will slice/dice and cook onions to achieve the Maillard reaction and caramelization. If possible, recommend providing guidance on how long to cook onions at medium high heat before lowering the heat. The amount of time that onions should be cooked at each phase would be really helpful for participants to mimic what they learned in the video.
 - Instruct participants to take their time cooking the onions.
 - Instruct participants to taste test both the raw and caramelized onions. Lead a discussion on their different tastes before and after cooking.
 - Discard waste.

POST ACTIVITY

- After completing the hands-on activity, recap the lesson with the participants. Offer an opportunity for participants to share their learning experience during the training and highlight any tips or takeaways they want to share with the group.
- If time allows, facilitate a discussion with the participants. Suggested discussion topics include:
 - Ask participants to describe how the flavor of the onion changes when cooked.
 - Ask participants to describe how using the Maillard reaction and caramelization enhances the flavor of the onion and makes it more pleasing to students' taste preferences than a raw onion.
 - Ask participants how using this technique in school menus could make dishes more appealing to student preferences.
- Ask if the participants feel more comfortable with this training topic or want more time to develop the skill further if time allows.
- Plan the next training session based on the needs of your staff.
- Remind participants that they should not add ingredients to any standardized recipe without consulting with the Menu Planner or Supervisor first. Recipes may need to be tested/analyzed when adding spices/herbs/culinary acids, etc. before implementing in school cafeterias.



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