



Introduction to Cooking with Gas

Lesson 5: Griddling

BEGINNER



Introduction

Welcome to Introduction to Cooking with Gas. Today's topic is the proper operation of equipment to reduce gas usage and bills. Once you learn about proper operation of your equipment, you will learn how to cook with gas to make your own grilled cheese sandwich.

This lesson can be completed in a classroom or at home. Your teacher will provide instructions for completing the assignment from home.

Opening Assessment

1. Which of the following would be a good way to save money on energy bills?
 - a. only cook enough food for one meal
 - b. preheat oven before starting food prep
 - c. use a small burner for a small pot
 - d. cook foods at a low temperature
2. What does the transfer of heat by conduction require?
 - a. direct contact with a hot surface
 - b. absorbance of electromagnetic waves
 - c. circulation of air around a surface
 - d. indirect exposure to a heat source
3. What type of cooking uses fat or oil for the transfer of heat?
 - a. grilling
 - b. broiling
 - c. griddling
 - d. baking
4. Which of these foods would be cooked on a griddle?
 - a. stew
 - b. pasta
 - c. bacon
 - d. rice
5. What utensil might be required to cook a food properly on a griddle?
 - a. a knife
 - b. a spatula
 - c. a ladle
 - d. a whisk

Proper Operation of Equipment to Reduce Gas Usage and Bills

Energy efficient cooking is the key to keeping energy costs down in both a home or commercial kitchen. Energy Star® appliances are engineered to use less energy, independent of how the cook operates the equipment. A standard gas oven has a 30% rate of efficiency, while an Energy Star gas oven has a rate of 44%. Energy Star appliances can be more expensive than standard equipment, but the efficiency rating saves on utility usage resulting in lower operating cost.

Even without the most up-to-date cooking technologies, the proper operation of cooking equipment can reduce energy costs. Anything a cook can do to increase useful energy in relation to total energy will save money.

Cooking with Natural Gas

The best way to reduce energy waste when using any piece of kitchen equipment, whether at home or in a commercial kitchen, is proper timing of the cooking process. In a commercial kitchen, just as in a home kitchen, energy can be saved by proper timing of start-up and shut-down of equipment. Most commercial cooking equipment requires only 15 minutes to preheat, so it is not necessary to turn equipment on early in the morning for service at lunchtime. During slow business hours, such as between lunch and dinner service, turning equipment off will save energy. Shutting equipment down immediately after service is as important in a restaurant as it is at home. Some restaurants institute a start-up and shut-down schedule that reminds staff when to turn equipment on and off.

Cooking Methods

There are three types of cooking methods that utilize natural gas:

1. **Moist cooking** involves cooking with moisture in either liquid or steam form.
2. **Dry cooking** involves cooking without any moisture.
3. **Combination cooking** combines moist and dry heat cooking.

Today, you will be learning about and preparing food using a dry cooking method.

Dry Cooking: Griddling

Dry cooking methods include broiling, grilling, griddling, roasting, baking, sautéing and deep frying. Some of these methods utilize a fat such as butter, margarine or oil in order to cook the food, but some of these methods are very dry and simply rely on a source of heat and the fat content within the food itself. With or without the help of added fat, the heat source in dry cooking acts directly on the surface that holds the food. In grilling, griddling and sautéing, the heat comes from below; in broiling, the heat comes from above; and in roasting, baking and deep frying, the heat comes from all around the food.

This lesson will utilize a griddle or griddle pan and the dry cooking method. A griddle is a smooth, flat surface made of metals that are good heat conductors, such as steel, chrome or aluminum. Natural gas griddles are often preferred because they can achieve temperatures and recover more quickly than non-natural gas alternatives. Because foods cooked on a griddle have contact with the heated surface only on one side at a time, foods must be turned over to cook thoroughly and evenly without too much browning or caramelization on one side or the other. Browning is often referred to as caramelization because the fat on the griddle or in the food reacts to the heating surface.



A gas griddle in a commercial kitchen

The cooking area on a griddle is called the plate. The plate is a slab of metal of uniform thickness, but plates come in different thicknesses, usually from $\frac{1}{2}$ to 1 inch, depending on the type of food being cooked. The heat from the burners below the plate diffuses through the plate to the surface where the cooking is done. Thicker plates may take longer to heat up, but they store heat better and are preferred for cooking meats and frozen items. Thinner plates are better for more delicate items like

eggs. Commercial griddles also require an exhaust hood overhead to remove radiated heat, smoke, steam and airborne particles of grease rising from the griddle surface during cooking.

In a commercial kitchen a griddle will most often be made of steel, which is the most affordable metal, and must be large enough to cook a lot of food at the same time. Griddles are available as single units on a cabinet base or standard legs, countertop units on an equipment stand or drop-in to a chef's counter.

Gas griddle temperature controls are similar to those on a gas range, with separate knobs controlling separate burners located under the plate. Some griddles are manually controlled, with the line cook lowering and raising the heat across a range of low, medium and high. This does not allow for precise control of temperature at the cooking surface, which typically requires a range of 200° to 550° to cook a variety of foods. Other commercial griddles have controls that allow the line cook to set the temperature of the griddle surface directly over the individual burners. A large commercial gas griddle with individually controlled burners can maintain different cooking zones for different kinds of foods, and some of its burners can be shut off when business is slow.



The griddle is a busy station in any restaurant because of the popularity of griddled foods such as eggs, bacon, pancakes and burgers. Griddles are often used for browning the surface of a food. This can apply to steaks as well as sandwiches. If you cut into a steak that has been cooked rare on a griddle, the center of the steak will remain red and stay cool, while the outer layers will be seared and brown. Browning is a chemical reaction that occurs when sugar and amino acids, or proteins, form a compound when exposed to high temperatures. Searing at a high temperature is a more intense browning technique used for meats to seal the juices inside. Browning, taken too far, is called burning!

Browning and searing create food debris during cooking. Regularly scraping the griddle plate is recommended to eliminate excessive piling up and burning of food debris. Cleaning a griddle at the close of service involves shutting down the heat and waiting for the temperature to decrease, spreading a factory recommended griddle cleaner on the surface (the griddle has splash guards), scraping the surface and treating it with a thin layer of cooking oil.



Instructor Demonstration

Watch the instructor demonstration on proper natural gas range safety and how to prepare a grilled cheese sandwich on a griddle. Answer the following questions as you watch the demonstration.

- What safety tips did the instructor give during the demonstration?
- How did the instructor flip the grilled cheese?
- Was any movement other than flipping necessary to cook the grilled cheese?
- How did the instructor determine how long to cook the grilled cheese?
- What cooking tips did the instructor give during the demonstration?

Selecting and Preparing a Recipe

The following section can be completed at home if the preparing and cooking can be performed safely. Residential and commercial cooking equipment vary; while the information focuses on natural gas equipment, electric ranges and stoves may also be used to complete the cooking assignment.

Now you are going to make your own grilled cheese sandwich using bread, butter or margarine, and cheese. Once cooked, the grilled cheese sandwich should be golden brown and crispy on the surface of the bread and the cheese melted inside. If you like the bread a darker brown, you may grill it until it reaches your preference.

Your teacher will review your recipe and dish based on the criteria listed below. If you are learning remotely, your teacher will provide you with instructions on how to submit your recipe and images or video(s) of your completed dish.

Criteria	Excellent 3	Proficient 2	Emerging 1
Procedure	clearly followed given instructions and the example provided in the demonstration	somewhat followed given instructions and/or the example provided in the demonstration	did not follow given instructions and/or the example provided in the demonstration
Content (submitted photos, procedure, videos, etc.)	content and explanations were thorough and well detailed	included content and explanation but included few specific details	included little to no additional content or explanations and/or no specific details
Organization	organized when preparing and making their recipe	somewhat organized when preparing and/or making their recipe	not organized when preparing and/or making their recipe

Create Your Recipe

For this recipe you will need to choose one item from the bread column and one item from the fat column. You can choose to add any additional ingredients or seasonings based on your preference, dietary restrictions, allergies and available ingredients. Before starting to cook, it is important to have all of your ingredients, tools and equipment prepared ahead of time, what chefs call “mise en place” or “everything in its place.”

Select a type of bread:

Sliced bread of your preference; wheat, white, rye, gluten-free

Select a fat:

Butter or margarine

Select a type of cheese:

Pre-sliced American, cheddar or Swiss; dairy-free cheese; vegan cheese substitute

Safety first:

- Always keep a Class ABC fire extinguisher nearby.
- If you are cooking at home, make sure the burner you choose fits the pan or griddle you are using. Any part of the flame that is exposed creates an increased fire hazard, and it can also heat the handle of the pan.
- Do not allow the handle of the pan to stick out beyond the front of the rangetop where you could accidentally bump into it.
- Never leave any flammable material near the burner flame while you are cooking. Keep unused oven mitts, kitchen towels, or plastic wrap well away from the range. Roll up or avoid long sleeves while cooking. The rangetop should also be clear of other pots and pans, and the nearby countertop clear of anything that is not going to be used in your recipe.
- The cooking surface of a griddle can be very hot, so use oven mitts or potholders to protect your hands.
- Make sure the cheese slices do not extend over the edges of the bread, or the cheese will melt directly onto the pan’s surface and burn.
- When flipping food, use a spatula that is large enough for the item you are cooking.
- Never use wet or moist potholders, oven mitts or towels as they will conduct heat, burning your hands.
- Practice knife safety when cutting any ingredients and use properly sharpened knives

Equipment:

- Seasoned griddle or shallow pan
- Butter spreader
- Spatula

Ingredients:

- Choice of fat
- Choice of bread
- Choice of cheese

Procedure:

1. Preheat your griddle or pan to medium heat (see tips).
2. Spread one side of each slice of bread with a thin layer of butter or margarine.
3. When the griddle/pan is preheated, place one slice of bread, buttered side down, in the griddle/pan. Carefully lay the cheese slices on top, making sure they do not extend over the edges of the bread. Immediately place the other slice of bread on top of the cheese, buttered side up. Optional: Use a sandwich press.
4. After a minute, lift an edge of the sandwich to check the browning process. You want a golden brown, not a pallid yellow or a dark brown (unless you like dark brown). Leave on/in the griddle or pan if you prefer more browning.
5. When one side is golden brown, insert the spatula all the way under the sandwich and flip it over. Usually the second side will brown faster. (If the bread is browned but your cheese is not fully melted, do not wait too long for the cheese to melt or the degree of browning may not be to your liking. Turn the heat to low and allow to stay on/in the griddle or pan until the cheese has melted.)

Tips:

- Margarine has a higher percentage of water than butter and may result in a sandwich that is not as crispy.
- Cheese slices can be brought to room temperature before the start of cooking. This will help the cheese melt as the bread browns on the griddle.
- Butter or margarine can be at room temperature for easier spreading.
- Preheat the griddle or pan for two or three minutes, depending on its thickness. A thicker, heavier pan will take longer to preheat.
- Before you flip your sandwich, check that the bread is adhering to the cheese. Otherwise, the parts of the sandwich could separate. If you must flip it to prevent burning on one side, flip it carefully and be prepared to readjust the parts with the edge of the spatula.

Activity

After you finish cooking your grilled cheese, you'll complete this table. For each food in column 1, fill in a possible cooking method and the primary method of heat transfer each cooking method involves.

Dry cooking methods: broiling, grilling, griddling, roasting, baking, sautéing and deep frying

Moist cooking methods: steaming, boiling, poaching, blanching

Heat transfer: convection, conduction or radiant

Food	Cooking method	Heat transfer
chicken breast		
scrambled eggs		
hamburger		
broccoli		
doughnuts		
potato		
cake		

Final Assessment

1. Which of the following would be a good way to save money on energy bills?
 - a. only cook enough food for one meal
 - b. preheat oven before starting food prep
 - c. use a small burner for a small pot
 - d. cook all foods at a low temperature
2. What does the transfer of heat by conduction require?
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5. What utensil might be required to cook a food properly on a griddle?
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 - b. a spatula
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 - d. a whisk

Introduction to Cooking with Gas—Beginner

Lesson 5: Griddling

Teacher Guide

(1 class session)

Introduction

This lesson covers a basic understanding of the proper operation of equipment to reduce gas usage and bills. Then, students will learn how natural gas is used on a griddle or rangetop griddle to make a grilled cheese sandwich. Keep in mind that students may have dietary preferences, restrictions or allergies that may need to be accommodated in order for them to complete the recipe. Note that students may have different types of appliances at home, such as an electric or induction range, which will not prevent them from completing the assignment. If the student is preparing food at home, ensure that appropriate adult supervision will be available.

This lesson could be completed in a classroom or at home. Suggestions and instructions will be given for both scenarios.

Opening Assessment Answer Key (3 minutes)

Use these questions to obtain a baseline for what your students know before beginning the lesson. The correct answers are highlighted.

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How Does Proper Operation of Equipment Reduce Gas Usage and Bills? (5 minutes)

Students will read about cooking energy efficiency. The following questions could be used for a class discussion or given to students to complete individually.

- Why is energy efficiency important?
- What is cooking energy efficiency?
- What does a convection oven do that promotes cooking energy efficiency?
- How does the type of cooking environment have an impact on efficiency?

Cooking with Natural Gas (5 minutes)

Students will read about how proper operation of equipment can reduce gas usage and bills. The following questions could be used for a class discussion or given to students to complete individually.

- What are some things you should consider when choosing a pot or pan to cook a meal?
- What are some things you should consider when choosing a burner for your cooking job?
- What practices might yield the greatest savings when cooking?

Cooking Methods (2 minutes)

Students will understand that there are three cooking methods that utilize natural gas: moist cooking, dry cooking and combination cooking.

Dry Cooking: Griddling (5 minutes)

Students will read about cooking with dry heat and the griddling technique. The following questions could be used for a class discussion or given to students to complete individually.

- Given what you know about how a griddle works, what foods might not get cooked properly on a griddle?
- What way is sautéing similar to griddling? What ways is it different?
- What other cooking methods create browning?

Instructor Demonstration (7 minutes)

The demonstration can either be performed in class or recorded for remote use. If the demonstration is done in person, bring the butter and cheese to room temperature and preheat the commercial griddle to 375° before students come to class, and butter the bread slices while the students complete their readings so that you will only need to demonstrate the cooking process, not the prep process. The cooking part of the lesson should take no more than eight minutes.

The demonstration should include:

- how a griddle works
- safety tips when using a griddle
- how you are being energy-efficient while you cook the sandwich
- how hot the griddle should be before cooking
- benefits of using griddling as a cooking technique
- proper technique for flipping food on the griddle
- how to check each side of the grilled cheese for doneness

Students will use the following questions as a guide to either a class discussion after the demonstration or note taking during the demonstration:

- What safety tips did the instructor give during the demonstration?
- How high did the instructor have the temperature?
- How did the instructor determine how long to cook the grilled cheese?
- What cooking tips did the instructor give during the demonstration?

Selecting and Preparing a Recipe (20 minutes)

If the students will be cooking in the classroom, ensure the ingredients are available ahead of time. Make sure that student allergies, dietary restrictions and preferences are taken into account. Also, be sure to plan a few minutes at the end of class for cleanup.

If the students are cooking at home, be sure to provide the ingredients or the “mise en place” ahead of time to give the students time to assemble them. Consider the time the recipe typically takes to cook and the ability for students to purchase their ingredients from the grocery store.

Students will use the instructor demonstration as a guide to cooking their own grilled cheese sandwich. Students will select a bread, a fat and a type of cheese.

Students cooking at home can submit a description of the ingredients and procedure they used along with pictures of their completed dishes or a video of themselves cooking the recipe. Be sure to share instructions with your students on what to submit and how to share it with you.

Scoring Rubric:

Criteria	Excellent 3	Proficient 2	Emerging 1
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Activity (10 minutes or as homework)

This activity is provided to be used either in the classroom during any down-time, or as homework. In this activity students will complete this table. For each food in column 1, students will fill in a possible cooking method and the primary method of heat transfer each cooking method involves. Answers will vary for some foods.

Dry cooking methods: broiling, grilling, griddling, roasting, baking, sautéing and deep frying

Moist cooking methods: steaming, boiling, poaching, blanching

Heat transfer: convection, conduction or radiant

Food	Cooking method	Heat transfer
chicken breast	broiling (baking, sautéing)	radiant (convection, conduction)
scrambled eggs	griddling	conduction
hamburger	grilling (broiling, griddling)	radiant (radiant, conduction)
broccoli	steaming (boiling)	convection (convection)
doughnuts	deep frying	convection
potato	deep frying (baking, boiling, roasting)	convection (all convection)
cake	baking	convection

Final Assessment: Answer Key (3 minutes or as homework)

Use these questions in conjunction with the discussion questions in each section to formatively assess student growth over the course of the lesson. Address any student misconceptions that remain at the end of the lesson. Consider having students compare their opening assessment with their final assessment to see how their understanding of cooking with gas improved over the course of the lesson.

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