SoCalGas

Introduction to Cooking with Gas

Lesson 8: Stewing



BEGINNER

Introduction

Welcome to Introduction to Cooking with Gas. Today's topic is stewing using a range or stovetop and learning how to turn gas appliances on and off properly. Once you learn about stewing using a range or stovetop, you will learn how to cook with gas to make your own stew.

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 statement applies to stewing?
 - a. The food is totally submerged in water.
 - b. It only works with softer pieces of meat.
 - c. It takes very little time to complete a meal.
 - d. Minimal oil is needed to tenderize the food.
- 2. Out of what material is a Dutch oven usually made?
 - a. steel
 - b. plastic
 - c. cast iron
 - d. aluminum alloy
- 3. What is an advantage of using natural gas for cooking?
 - a. It reduces cooking time.
 - b. It produces cleaner byproducts.
 - c. It prevents food from drying out.
 - d. It takes longer to use up than other fuels.
- 4. Which type of meat works best for stewing?
 - a. those that have natural juices
 - b. those that are high in collagen
 - c. those that can bleach easily when heated
 - d. those that keep their shape when exposed to heat
- 5. What happens to vegetables when they are stewed?
 - a. Their fibrous tissues break apart.
 - b. The collagen inside them melts away.
 - c. The texture of the tissue becomes chewy.
 - d. Their vitamins leach out into the surrounding water.



Comparison of Natural Gas to Other Fossil Fuels

Natural gas is a **fossil fuel** that comes from deep underground. It has several important uses, including heating and cooking. It is also used to generate electricity. Natural gas that is used to generate electricity is sent to gas power plants that burn the fuel to generate electricity for the power grid. Virtually all of the natural gas consumed in the United States comes from operations within the country.



The graph below shows the main areas where natural gas is used.

Image Credit: EIA

The graph below shows how natural gas usage compares to other fuel sources over time.



U.S. natural gas consumption by sector, 1950-2019

Image Credit: <u>EIA</u>



Even though natural gas is a fossil fuel, it burns much cleaner than other fossil fuels. This means that it does not emit as much carbon dioxide when burned compared to other fossil fuels. This is a good thing for the environment since human-produced carbon dioxide is the main contributor to global climate change. Improvements to natural gas power plants have helped to decrease the output of carbon dioxide further.

The table below compares the carbon dioxide emissions of various fossil fuels per British thermal unit (Btu).

2 -	
Fuel Source	CO2 Emitted (lb/million Btu)
Coal (anthracite)	228.6
Coal (bituminous)	205.7
Coal (lignite)	215.4
Coal (subbituminous)	214.3
Diesel fuel and heating	161.3
Gasoline (without ethanol)	157.2
Propane	139.0
Natural gas	117

Pounds of CO, emitted per million British thermal units of energy¹

¹United States Energy Information Administration

Coal is the main contributor to carbon dioxide emissions. When it burns, it releases the gas into the air, causing all kinds of pollution. Diesel fuel and gasoline are better than coal but still release emissions. Natural gas is by far the cleanest fuel source. In fact, natural gas plants emit carbon dioxide at about half the rate of coal plants per kilowatthour of electricity generated.



Cooking with Natural Gas

Cooking with natural gas is a great way to have controlled heat and make sure the food is cooked throughout. In California, cooking with natural gas is very popular, and many commercial and industrial kitchens have gas-powered appliances installed. A recent report estimated that about 70 percent of all appliances in commercial and industrial kitchens use natural gas as their energy source. The graph here shows an estimated number of the different types of gas appliances in kitchens around the state.



Image Credit: Beyond the Blue Flame

With the popularity of natural gas as an energy source for cooking, it is also important to be mindful of safety and pollution when using this energy source. Cooking with natural gas is much cleaner than other energy sources, but using natural gas can be dangerous.

Turning on the natural gas range or oven only when needed helps cut down on injuries, as leaving a gas range on while unattended can cause fires. Making this a priority can also save gas in the long run by ensuring it does not get wasted. When not in use, check that the gas knobs (used to control the flame's intensity) are turned off. This easy step reduces the chances of gas free-flowing into the gas lines and building up.



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 combination cooking method.

Combination Cooking: Stewing

Combination cooking methods include braising and stewing. Each method utilizes browning and fully submerging in liquid in order to cook the food. This lesson will utilize a range, large pot or Dutch oven, and the stewing cooking method. A **Dutch oven** is a metal, thick-walled cooking pot that has a tight-fitting lid. It is usually made of cast iron. Sometimes the metal is covered with enamel. If a Dutch oven is not available, a normal metal pot will work just as well. This is a container made out of metal (usually stainless steel) that has tall sides and a lid. Just make sure the pot is large enough to hold all of the ingredients.



Dutch oven

Foods like meat and vegetables cook well in combination cooking. For stewing, meats that are high in collagen are best. Examples of these include brisket, oxtail or chuck roast. Chicken also works well. Vegetables that are ideal for stews include carrots, potatoes, onions and celery. These work well because their fibrous tissues break apart, leaving them chewable yet firm when done. When stewing, it is important to fully submerge the food in liquid to complete the cooking process. In essence, you are creating a hot water bath that allows the ingredients to continue cooking by surrounding them with heat.

Doing this lets the food cook all the way through, making it more tender. You will learn how to utilize moist and dry heat forms to cook various proteins and vegetables throughout your lessons on combination cooking.



Instructor Demonstration

Watch the instructor's demonstration on proper natural gas range safety and how to use the range and the pot or Dutch oven to make the stew. Answer the following questions as you watch the demonstration:

- What safety tips did the instructor give during the demonstration?
- How much water was added to the pot after browning took place?
- How large were the pieces of meat that were added to the pot?
- How did the instructor determine how long to cook the protein and vegetables?
- 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.

This section will be completed without making the stew, as there is not enough time to prepare the entire recipe within the allotted amount of class time. Instead of actually cooking the recipe, you will be observing your instructor prepare the stew, and then write up a detailed analysis of the ingredients you would select if you were preparing the recipe, as well as answers to the activity that follows. Your instructor will demonstrate some of the techniques to be used if you were to prepare the stew.

Imagine you are going to make your own stew using protein, potatoes and assorted vegetables. Once cooked, the stew will be spooned out into large bowls. You can optionally top the stew with some flavorings.



Create Your Recipe

For this recipe, you will need to choose one item from the protein and one item from the fat categories. You can choose to add any additional ingredients, toppings or flavors 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 protein:	Select a fat (1 Tbsp):	Select the vegetables/add-ins:	
chicken breast	butter	carrots	thyme
chicken thighs	olive oil	onions	bay leaf
tofu (or meat substitute)		baby potatoes	basil
chuck beef tips		celery	kosher salt
		garlic	parsley
		ground pepper	sweet potatoes
		chicken/meat/ vegetable broth	

Safety first:

- Always keep a Class ABC fire extinguisher nearby.
- Ensure the pot is not filled to the top so it doesn't spill when it simmers or when you add the vegetables.
- Make sure there are no pot holders, towels or other flammable materials next to the burner.
- Make sure there are no plastic or meltable objects next to the burner.
- Always use potholders to protect your hands from burning on the hot pot.
- Always pour hot liquids away from you.
- Do not put your face directly over the pot as splashing may occur.
- Be extra careful when chopping the vegetables and potatoes.
- Never use wet or moist potholders, oven mitts or towels as they will conduct heat, burning your hands.
- Practice knife safety when cutting the vegetables and use properly sharpened knives.



Equipment:

- Gas stovetop or range
- Dutch oven or large pot
- Medium bowl
- Stirring spoon
- Potholders
- Serving spoon/ladle

Ingredients:

- Choice of 2 tbsp of oil or butter
- Choice of vegetables, peeled and sliced
- Choice of spices
- 1 tbsp all-purpose flour
- Choice of 1½ lb. of protein
- Choice of potatoes, ¾ lb., quartered
- Choice of 3 cups broth (chicken, meat or vegetable)



Procedure:

- 1. In a Dutch oven or large pot over medium heat, melt butter or add the oil. Cut the vegetables and potatoes into small pieces. Add the vegetables and season with spices. Cook, stirring often, until vegetables are tender, about five minutes. If used, add garlic and cook until fragrant, about 30 seconds.
- 2. Add flour and stir until vegetables are coated, then add protein, other spices, potatoes and broth. Season with salt and pepper. Add the broth and bring mixture to a simmer and cook until the protein is done all the way through and potatoes are tender, 15 minutes.
- 3. Remove the Dutch oven or pot from the heat. Wearing potholders, carefully use two forks to lift the protein out and transfer it to a medium bowl. Using the same forks, shred the protein into small pieces and return the pieces to the pot. Mix everything together with the serving spoon or ladle.

Tips:

- Make sure the vegetables are chopped into small pieces so they will cook faster.
- Double-check the internal temperature of meats, as eating undercooked meats can be dangerous.
- Stir occasionally while simmering to prevent the stew from sticking to the bottom of the pot.



Activity

Since this dish takes longer than one class period to complete, respond to both prompts in place of actually preparing the stew.

- 1. Why did you make the ingredient selections you did? Were they related to a particular dietary requirement or a personal flavor preference? How do you think these flavors will work together to produce a tasty stew? Focus on the ingredients and describe what you think you would have tasted when eating the stew. What would you recommend as a side dish and dessert to go along with your stew? Why do you say that? Will the flavors complement each other or be totally different? Explain your selections.
- 2. Consider what you know about natural gas and how it is used for cooking. Would the stew you made be different if you had used an electric stove? How about a campfire? Describe how the preparation of the stew would have been different and why those differences might have happened.

4	3	2	1
 The student response fully responds to each part of the writing prompt with relevant, strong details has logical organization uses effective language and word choice for purpose and audience contains no errors in usage or grammar 	 The student response addresses each part of the writing prompt with sufficient details has sufficient organization uses mostly effective language and word choice for purpose and audience contains minor errors in usage or grammar that do not affect meaning 	 The student response addresses some of the writing prompt with weak details attempts organization uses some language and word choice for purpose and audience contains minor errors in usage or grammar that slightly affect meaning 	 The student response does not address a large portion of the writing prompt lacks organization rarely uses appropriate language and word choice for purpose and audience contains major errors in usage or grammar that greatly affect meaning



Additional Activity

Use the clues to fill in the crossword puzzle.



Across

- 1. A natural resource that burns hotter and cleaner than coal
- 3. The kind of gas range that has exposed burners
- 4. Gloves used to protect the hands from heat
- 5. Metal pot, covered with enamel and a secure lid
- 6. The fiber in the meat that breaks down during stewing
- 7. The spark needed to ignite the burners on a gas range

Down

- 1. A resource that is in limited supply and disappears once it is used up
- 2. The process of completely covering meat and vegetables with water before simmering



Final Assessment

- 1. Which statement applies to stewing?
 - a. The food is totally submerged in water.
 - b. It only works with softer pieces of meat.
 - c. It takes very little time to complete a meal.
 - d. Minimal oil is needed to tenderize the food.
- 2. Out of what material is a Dutch oven usually made?
 - a. steel
 - b. plastic
 - c. cast iron
 - d. aluminum alloy
- 3. What is an advantage of using natural gas for cooking?
 - a. It reduces cooking time.
 - b. It produces cleaner byproducts.
 - c. It prevents food from drying out.
 - d. It takes longer to use up than other fuels.
- 4. Which type of meat works best for stewing?
 - a. those that have natural juices
 - b. those that are high in collagen
 - c. those that can bleach easily when heated
 - d. those that keep their shape when exposed to heat
- 5. What happens to vegetables when they are stewed?
 - a. Their vitamins leach out into the surrounding water.
 - b. The texture of the tissue becomes chewy.
 - c. The collagen inside them melts away.
 - d. Their fibrous tissues break apart.



Introduction to Cooking with Gas—Beginner Lesson 8: Stewing Teacher Guide

(1-2 class sessions depending on the setting)

Introduction

This lesson explores the benefits of using natural gas as a fuel. Then, students will learn how natural gas is used in combination cooking to use a range for cooking stew. 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.

- 1. Which statement applies to stewing?
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 - c. The texture of the tissue becomes chewy.
 - d. Their vitamins leach out into the surrounding water.



Comparison of Natural Gas to Other Fossil Fuels (5 minutes)

Students will read about how natural gas compares with other fossil fuels in terms of the cleanliness of burning and emissions produced. The following questions could be used for a class discussion or given to students to complete individually.

- Which sectors use the most natural gas?
- What is a benefit of natural gas over other types of fossil fuels?
- Why is natural gas called a fossil fuel?

Cooking with Natural Gas (5 minutes)

Students will read about how natural gas contributes to air pollution when cooking with natural gas appliances. The following questions could be used for a class discussion or given to students to complete individually.

- How does turning on a gas stove contribute to air pollution?
- Why should gas appliances only be turned on when in use?

Cooking Methods (2 minutes)

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



Combination Cooking: Stewing (5 minutes)

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

- What are the benefits of cooking with combination heat?
- Why do you think the potatoes and vegetables are cut into small pieces before stewing?
- How does adding the liquid after dry cooking help to enhance the process?

Instructor Demonstration (10 minutes)

The demonstration can either be performed in class or recorded for remote use. If the demonstration is done in person, consider preheating the pot while the students complete their readings so that the pot is hot enough to begin stewing in time for your demonstration.

The demonstration should include:

- how a gas range works
- safety tips when using a gas range and pot/Dutch oven
- knife techniques and safety when cutting the protein and vegetables
- how to cook the vegetables, including tips for how to keep them from burning
- benefits of using stewing as a cooking technique
- how to cook the stew, noting how to check proteins for doneness
- finishing the stew by adding everything together and incorporating other optional ingredients

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

- What safety tips did the instructor give during the demonstration?
- How high did the instructor have the flame underneath the pot?
- How did the instructor determine how long to cook the vegetables and the protein?
- What cooking tips did the instructor give during the demonstration?



Selecting and Preparing a Recipe (5 minutes)

The recipe provided will take longer than one class period to complete. As such, instead of having the students prepare the recipe, have students read the recipe instructions and select the ingredients that they would choose if they were cooking the recipe, then complete the writing prompts in the Activity section below.

Students will use the instructor demonstration as a guide to writing about how to cook their own stews. Students will select a protein, a fat, vegetables and optional flavorings and toppings from a list in order to complete their recipe.



Activity (15 minutes)

Since this dish takes longer than one class period to complete, respond to both prompts in place of actually preparing the stew.

- 1. Why did you make the ingredient selections you did? Were they related to a particular dietary requirement or a personal flavor preference? How do you think these flavors will work together to produce a tasty stew? Focus on the ingredients and describe what you think you would have tasted when eating the stew. What would you recommend as a side dish and dessert to go along with your stew? Why do you say that? Will the flavors complement each other or be totally different? Explain your selections.
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Additional Activity: Answer Key (5 minutes or as homework)

Use the clues to fill in the crossword puzzle.



Across

- 1. A natural resource that burns hotter and cleaner than coal
- 3. The kind of gas range that has exposed burners
- 4. Gloves used to protect the hands from heat
- 5. Metal pot, covered with enamel and a secure lid
- 6. The fiber in the meat that breaks down during stewing
- 7. The spark needed to ignite the burners on a gas range

Down

- 1. A resource that is in limited supply and disappears once it is used up
- 2. The process of completely covering meat and vegetables with water before simmering



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.

- 1. Which statement applies to stewing?
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